

MINING

CONGRESS JOURNAL



JULY
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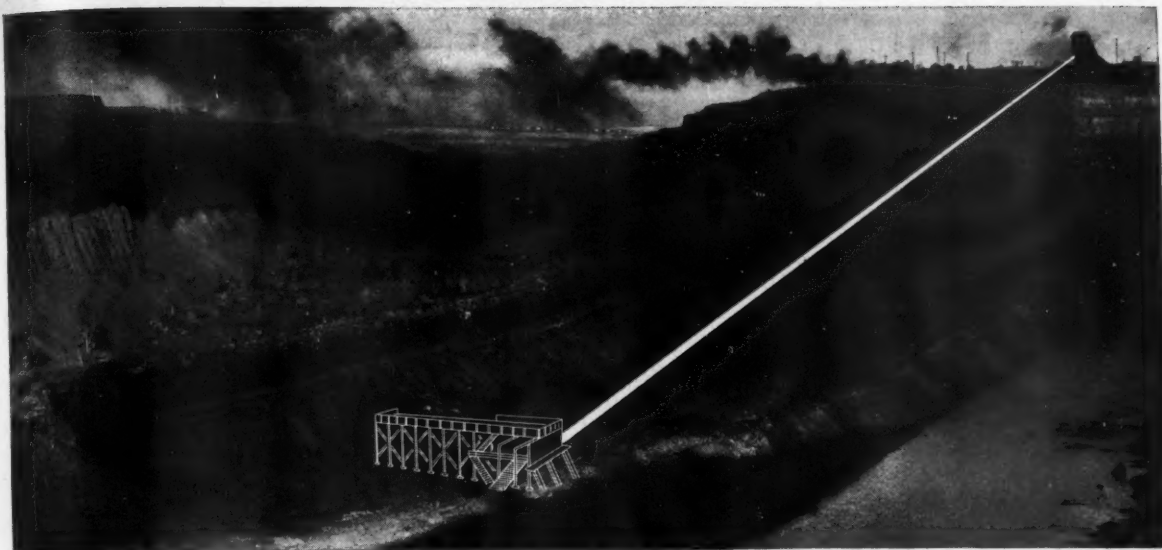
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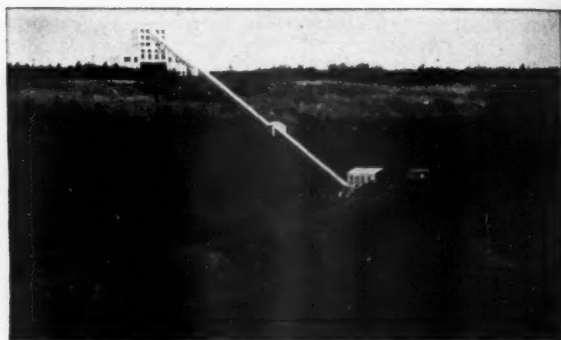
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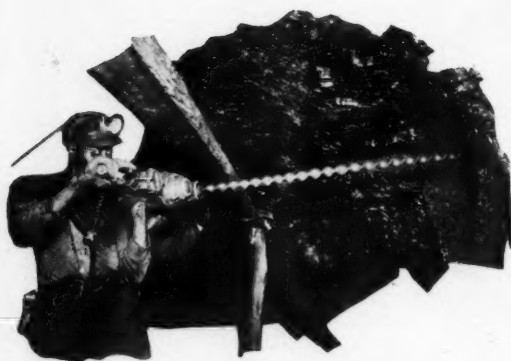
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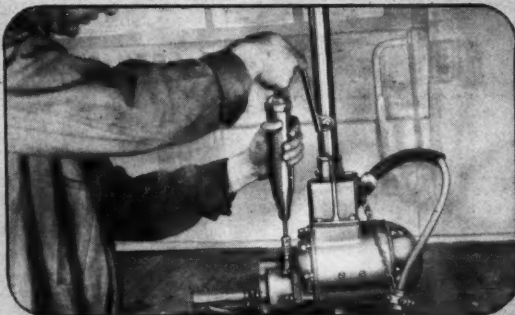
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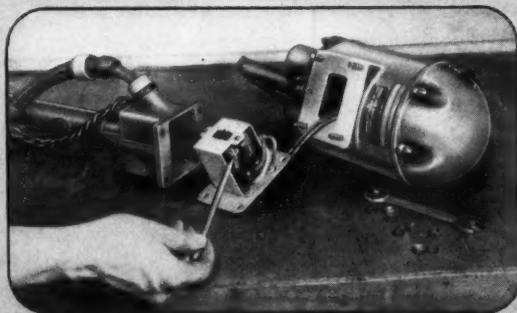
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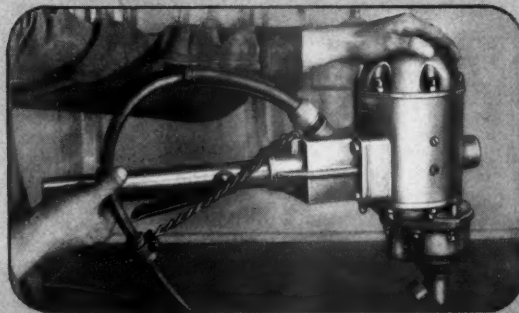
1 Every three months, clean out gear case and renew grease—no more than 2/3 full.



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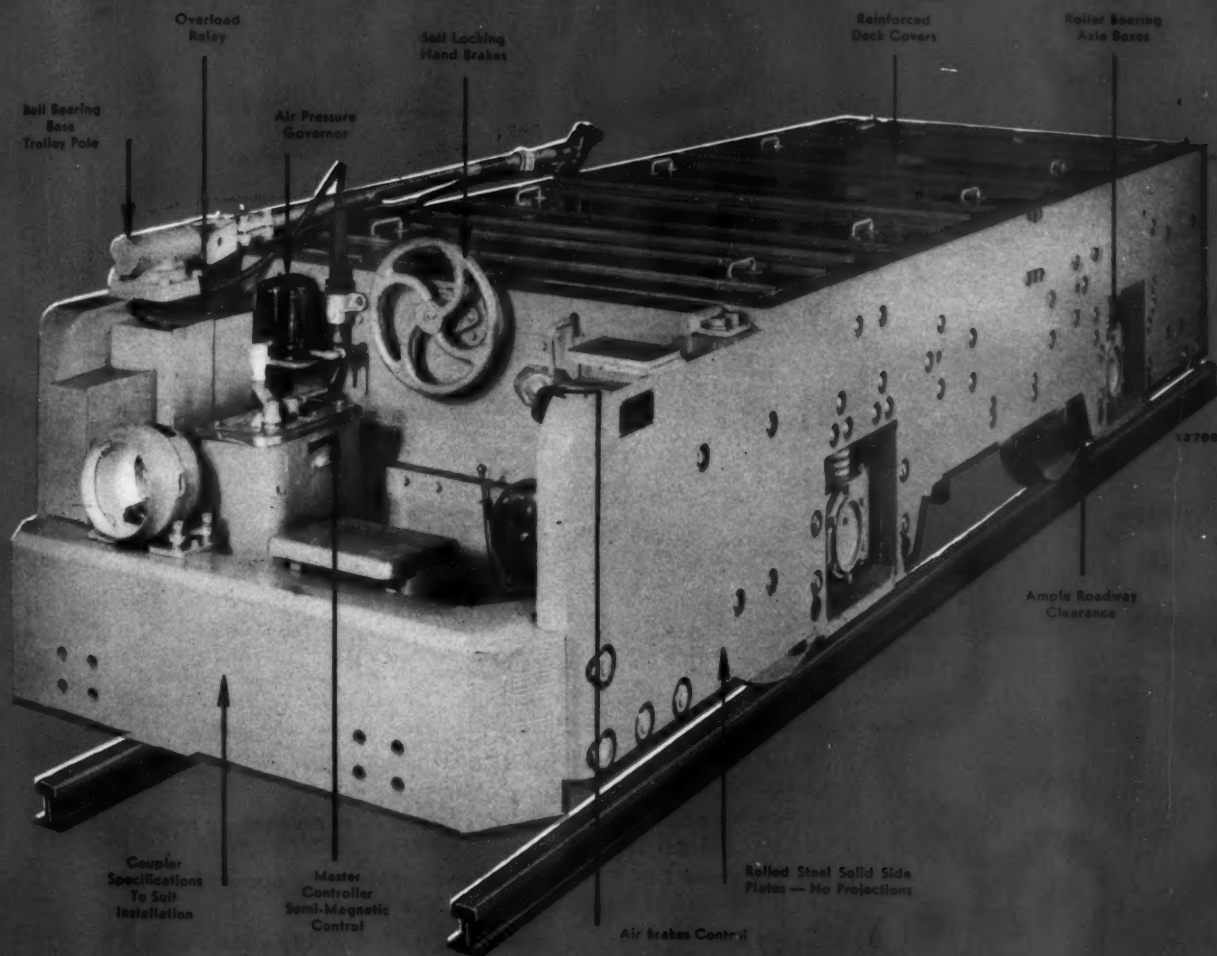
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Has U. S. Enough Aluminum? Hunt for Bauxite Is the Key

Ore Output Comfortable Now
but Long War Means Shortage
Unless New Sources Develop

Because aluminum is so vital to aircraft construction, the Army, Navy, and War Production Board have been haunted by the question: Will the United States have enough aluminum to win this war? Newsweek has set out to answer that question in two articles of which this is the first.

Even before Pearl Harbor, the United States Bureau of Mines said this nation's reserves of bauxite (the ore from which aluminum is made) would be exhausted within five or six years on the basis of known deposits and consumption then current. At that time America was making only 20,000 airplanes a year. President Roosevelt's order for 155,000 warplanes in 1942-43 was yet to come.

When it did, the production goal set a Herculean task for the aluminum industry. In the average military airplane 90 per cent of its body weight and 50 per cent of its engine weight are aluminum. The United States to produce 50 per cent more aluminum this year than the whole world made in the peak peacetime year (1,259,262,580 pounds in 1939). Of course, the means enormously increased plant facilities. But it also meant obtaining supplies of raw ore—4 to 5 million tons.

are needed to make a single pound of aluminum. Plant construction was comparatively simple. Where and how to get the ore was the real problem.

Until the United States went to war, 70 per cent of the aluminum produced here was made from high-grade bauxite that was imported—largely from mines in Dutch Guiana owned by the Aluminum Co. of America (Alcoa). The rest of our aluminum came from similar high-grade bauxite mined in Arkansas. In the past year, imports from South America have been sharply reduced because of shipping shortages and U-boat warfare. At the peak of the sinkings, only oil tankers were going down faster than bauxite ships. This supply catastrophe sent the aluminum industry and government officials spinning into a mad scurry for new domestic sources of aluminum-bearing ore.

So last winter, the Bureau of Mines shot out twenty exploration parties. They went to Arkansas and adjoining states to hunt for new bauxite supplies. They are still out prospecting and so far have not found 6,000,000 tons. But not much of it is grade, and the aluminum content is so low that it would cost \$100,000 to produce one ton of high-grade bauxite.

Interior Harold Ickes had ripped the WPA up the back for not following Bureau of Mines recommendations for using low-grade ore.

Aluminum production involves two principal steps: First, the aluminum oxide—alumina, it is called—must be extracted from the ore by a process of crushing, washing, and chemical action. Then this alumina, which looks a lot like powdered sugar, has to be treated with an electrolytic process which turns it into metal.

Until a year ago, the industry made most of its aluminum from bauxite containing not less than 50 per cent alumina or more than 5 per cent silica (the impurity which plays hob with alumina extraction). Today, bauxite with only 30 per cent alumina content and as much as 8 per cent silica is being used because existing extraction plants are being converted to utilize the lower grade. It is possible that ore containing an even higher percentage of silica will soon be used, thanks to improved washing processes now being developed.

The Bureau of Mines also is experimenting with processes to extract alumina from clays and other alumina-bearing earth. One-twelfth of the earth's crust is aluminum, but no process to get this commercially has yet been developed, though seven laboratories are trying to do so.

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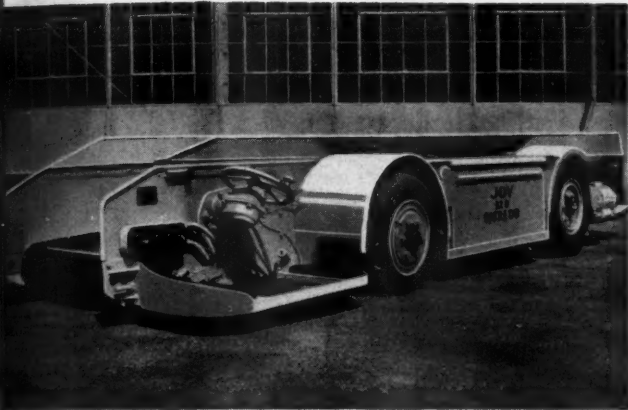


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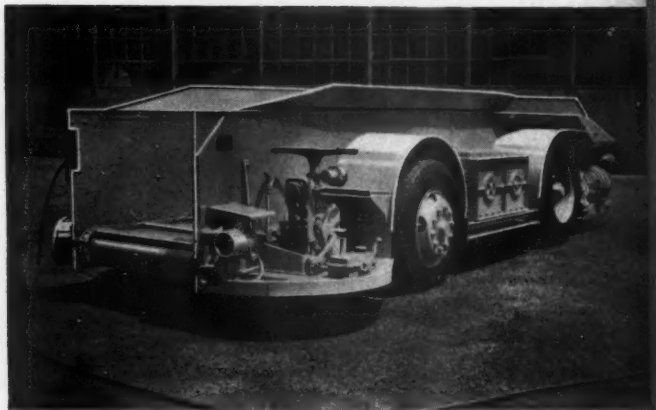


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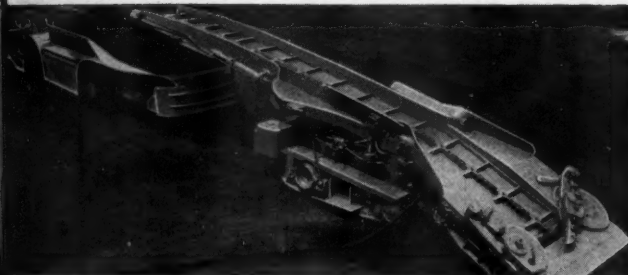
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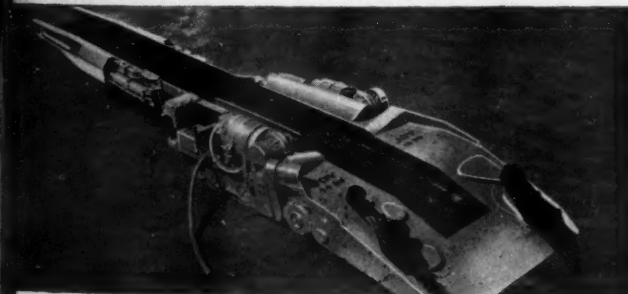
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HINTS FOR BETTER BLASTING

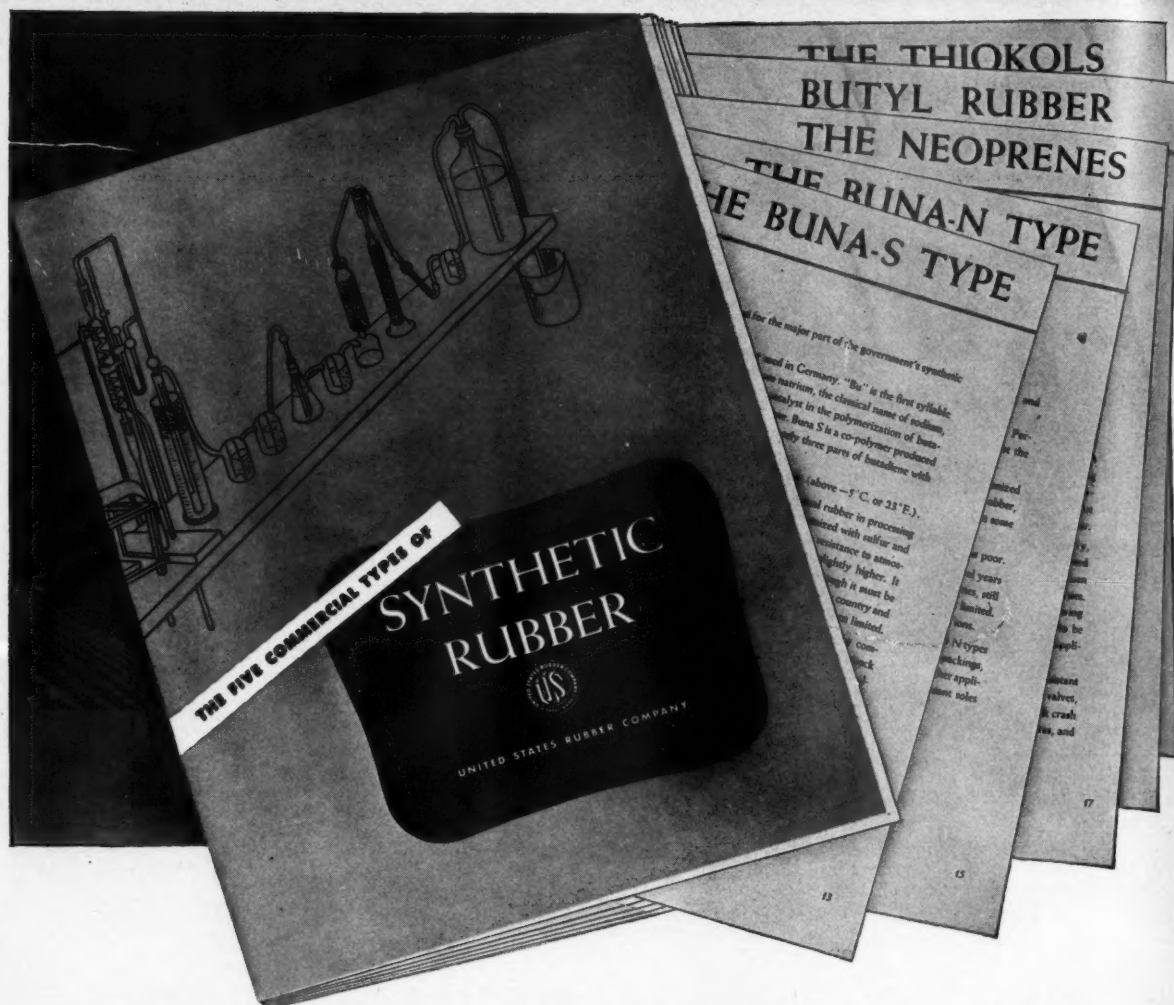
To prevent accidental firing make removal of the metal shunt the last step before connecting the leg wires into the blasting circuit.

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Number 7

Coal—The Home-Front Casualty

THE NATION has been taking a nasty "bombing" from apparent disunity, race riots and coal strikes, along with a rising crescendo of feudlike "flak" shot from high-ranking Washington Government officials declaiming against this and that—and each other. Attempts at ukase rule by irresponsible and "know it all" youthful braintrusters have befuddled and stymied the actions of serious-minded Government officials charged with the responsibility of getting things done in solving food, labor and other domestic problems.

No wonder the people are letting Congress know they are completely and utterly fed up with the manner in which labor and other difficulties are being handled and no wonder the Connally-Smith anti-strike bill was passed by Congress over the President's veto.

Weaving in and out of this confusion and strife during the last three months have been the negotiations between coal operators and officials of the United Mine Workers of America in futile attempts to find a basis for agreement and a new wage contract. The Government's War Labor Board, having the final authority under the national wage stabilization policy to approve all new wage contracts, invited mine operators and John Lewis to several hearings. The repeated failure of the mine workers, however, to appear before the Board has finally jockeyed the mine operators and their properties behind the eight ball, and the mines are now in the custody of the Government—just where John Lewis wanted them.

What did the miners get? On June 18, they gained through the authority of the War Labor Board, which acted within the wage stabilization program, the following: a \$30 increase pay per year for vacation; the furnishing of tools to day and monthly men without charge; tools or a money equivalent to contract workers, also the furnishing of safety equipment and mine lamps without charge. These items are estimated to be an equivalent of a 20 to 25 cents per day increase.

These concessions, balanced against the untold thousands of man shifts and wages which have been lost due to the walkouts during the last three hectic months, are, in any case, a high price to pay, not only for the coal miners, but more so in our total war effort.

What does it all add up to? The score, according

to Solid Fuels Administrator Ickes, shows that since April 1 coal production has been 23,000,000 tons less than called for in the 1943 schedule. Furthermore, coal operators have lost the management of their mines, and managers, directors, stockholders and taxpayers are wondering if our Government is permanently entering into the business of mining coal. It can be said that coal mining has become the first home-front industrial casualty in World War II.

The coal miner is on the spot. Operation Vice Chairman H. G. Batcheller of WPB said recently that in one week 126,000 tons of steel were lost through the coal strike, enough to build 60 destroyers. On July 1 Donald Nelson, WPB chairman, launched a "Steel for Victory" drive which has for its objective 2,000,000 more tons of steel. This is but part of the serious challenge confronting the coal industry.

All effort, ingenuity, cooperation and skill must be mobilized by every coal man so that we can demonstrate to the wide world our ability to mine an avalanche of coal and choke it down the throats of our enemies.

Coal has long carried the banner "Coal—Vital to Victory," but we must put on all pressure and make up for lost time if victory is to be achieved without needless waste of American lives.

Realistic Manpower Action Needed

INDUSTRIAL EXPANSION in the western States continues apace after two years of tremendous activity, and the western mines continue to lose men to war plants and to the armed forces. Production figures for copper, zinc, molybdenum and other critical metals are not available, but the tremendous demand for these important raw materials apparently shows the supply is insufficient for the war program.

The recent furnishing to the United States Employment Service of a priority listing of mines to new recruits indicates official concern over the problem, but is far from being a solution. Men now in the mines must be kept there, and several thousand more must be added to the ranks.

One important effort which must be intensified is the impressing of the miner, as well as the people in the mining communities with the importance of the miner's job, even though he doesn't wear a military uniform. Naturally, young men dislike being called draft dodgers and some miners have "joined up" because of aspersions cast in their home towns.

If these men thoroughly understood the importance of staying in the mines, they could better appreciate how much more they are actually helping buddies in foxholes by providing them with plenty of metal to win this war.

All possible sources of additional manpower have been canvassed, and the conclusion seems inescapable that the War Manpower Commission must press the issue with the War Department to secure the release of several thousand soldier-miners to return to the mines. All other efforts directed to getting workers or to carrying on an extensive recruiting campaign seem predestined to fall short of the industry's needs.

Time is short and demand for metals is great.

Safety at the Arthur and Magna Mills of the Utah Copper Company

THE Arthur and Magna concentrating mills of the Utah Copper Company had their inception shortly after the turn of the 20th century and were the result of persistent efforts to develop profitably a large body of low-grade copper ore. The plants are located a mile apart at Arthur and Magna, Utah, overlooking Great Salt Lake, about 18 miles west of Salt Lake City, and an equal distance north of the company's famous open-cut mine at Bingham Canyon, Utah. The mills have enjoyed a steady growth, and at present employ about 2,000 workmen, all busily engaged in helping break all previous production records. Utah Copper Company's operations supply about 27 per cent of the newly-mined copper produced in the United States.

Analysis of Accident Experience

Accident prevention has long been considered of paramount importance, and has matched the prodigious strides of the enterprise itself. Since 1917 yearly accident statistics have been maintained.

To further improve safety conditions, the company conducts periodic surveys of local problems, plus a study of the accident experience of other industries, which has resulted in adoption of the present smooth functioning safety program operating under the supervision of a safety engineer. It is essentially a cooperative plan calling for concerted action by management, the supervisory groups and employees. How well this program has suited the needs is disclosed by graphs I, II, III and IV, and tables I and II.

The frequency and severity has been computed by the National Safety formula: Frequency rate=Number of accidents per 1,000,000 hours worked. Severity rate=Number of days lost per 1,000 hours worked. Days awarded because of a permanent partial disability in addition to the actual time lost, plus the 6,000 days allowed for a fatality based on a 20-year industrial life expectancy, has also been included.

The accident figures at the Arthur plant were influenced somewhat during 1921, '30, '31, '32, '33, '34 and '35 by partial or total plant shut down. The Magna plant, during 1920, '21



By R. L. ERICKSON

Safety Engineer
Department of Mills
Utah Copper Company

and '22 was affected by similar conditions. In resuming operations after these periods, considerable accident increase is noted, due principally to the influx of many new and inexperienced workmen.

How the Safety Organization Functions

The plan of organization calls for a Safety Council composed of a central group, plant divisional bodies, departmental committees, departmental safety representative and a safety engineer. They are dedicated to decreasing accidents and the human suffering they cause.

Briefly, these groups are composed of and operate in the following manner: The central body, which is the controlling committee, consists of the management, the general superintendent of mills, the plant superintendents and the safety engineer, with the general manager as chairman. The plant division, or general safety council, is composed of the heads of all departments and the safety engineer, with the superintendent as chairman. They meet monthly and discuss and dispose of safety problems. All plans and decisions made are referred by them to the safety engineer and the departmental committees to be put into operation. The departmental committees

consist of the department head, the safety engineer, all foremen within that department, and one or more workmen elected from each group. They meet monthly with the department head as chairman. Each group within a department has an appointed safety representative who functions until relieved by a new appointee. It is his duty to be constantly on the alert for any unsafe condition or practice, noticed or called to his attention. It is his responsibility to correct the hazard if possible; if not, he must report it to his foreman for further consideration and action. The departmental safety representative is easily identified by a large button which he wears at all times, and the responsibility is rotated so that eventually everyone has an opportunity to participate. This is an excellent safety stimulator. All activities are coordinated by the safety engineer working under the supervision of the general superintendent of mills and the plant superintendents.

Any plant employe may call a hazard or unsafe practice to the attention of the safety organization by contacting a safety council member or the safety engineer. Minutes of all meetings are kept and forwarded to the members of the other committees. In this way they are able to keep in touch with the safety activities of the

other departments. A summary of the material contained in the minutes of the various committee meetings stating the final disposition of the safety problems under discussion are regularly a part of the plant divisional minutes. They are posted on the many plant bulletin boards to be read and commented upon by all employees and are the means of stimulating considerable safety interest. Plant accidents and near accidents are discussed at the meetings and ways are suggested and adopted for avoiding a recurrence. It is the duty of all members of the *General Safety Council* to make safety recommendations to the plant superintendent and the safety engineer, and to see that all safety rules and regulations are enforced as to all men under their supervision.

The newly hired employee is initiated immediately into the safety program. His education is started at the employment office where he is given general instructions intended to impress him with the importance attached to safety at the plants. This is followed by a detailed safety talk by his foreman, and as his working duties are assigned to him, all safety rules concerning the work are clearly outlined. This enables the new man to get off to a good safe start. How successful this early training has been was substantiated by a search of accident records covering the last five years which revealed that of those injured, the most recently hired had been on the job over six weeks.

Periodic inspections in conjunction with the plant safety engineer are conducted by the Utah State Industrial Commission, as well as by the Army since war was declared. Careful investigations are made of each lost-time accident and measures are taken to prevent a recurrence. Near serious accidents are also studied and the cause is either eliminated or corrected.

Cleaning
grizzlies
in the
primary
crushing
department,
using
cage
with
safety
belt
and
lines



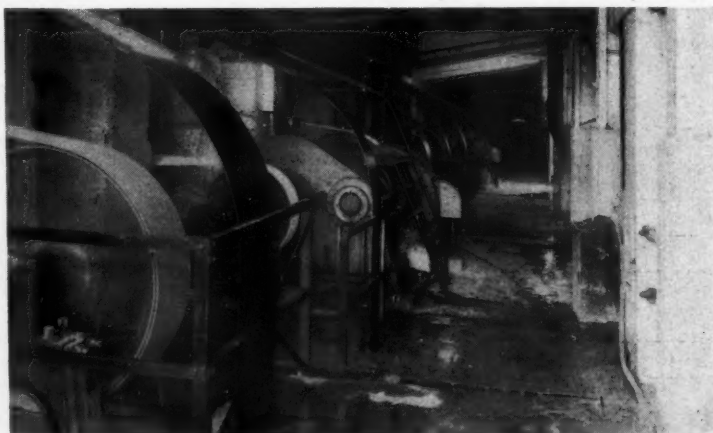
Other Safety Activities

First aid training has long been an important part of the safety program. A man so trained is safety conscious and is competent when at the scene of an accident. It has been the custom to periodically offer this training to all employees. For instance, in 1937 100 percent training was given at both mills. Approximately 350 more, mostly new untrained employees, took the course in 1940, and during 1942 several hundred more were given a brush-up course. The standard Bureau of Mines course of instruction is used and is taught by Utah Copper instructors under Bureau supervision. In addition, each plant yearly has a first aid team, which is given extensive training on company time and

competes with other industrial teams. This competitive work not only stimulates plant interest in safety and first aid, but creates a group with valuable leadership in the event of an accident. The injured is thus assured of receiving competent first aid treatment and transportation to the doctor. For the purpose of increasing their availability these men are selected from different departments for this training.

To further maintain interest in safety, pictures and posters are regularly posted and changed on some 30 or 40 bulletin boards in each plant. Pamphlets and safety magazines also play their part in keeping the men mentally alert to avoid accidents. Stretchers in well kept containers, are placed in prominent places in each department, available for instant use. Each is inspected monthly to insure its being in first-class condition. Emergency all-service gas masks in glassed-in containers are located at strategic places. In addition, several self-contained oxygen breathing apparatuses are kept available for emergency use.

The health of the workman is always an important factor in maintaining efficiency, keeping absenteeism low, and making him alert to avoid injury. To this end, change rooms of modern design are to be found in all departments. Most of them are provided with lunch room, locker room, showers, wash bowls, and other customary facilities. Ventilators, blowers and air-washer, or dust collecting, systems have been installed where needed. Routine gas masks, hoods, respirators and safety garments are also employed where necessary. The lighting system is excellent in all parts of the mills.



Guards cover the low pulleys in the line shaft in the fine crushing department



General view of the primary drag and classifiers, in the ball mill grinding department. Note excellent lighting, walkways, hand rails and guards

One of the most important links in the safety and health program is the plant hospital, one of which is located at each mill. They are fully equipped and modern in every detail, and furnish round-the-clock service. Each plant hospital is capably manned by a resident doctor and first aid attendants. The employees are encouraged to consult the medical staff regarding their health and are also urged to drop in for periodic physical check-ups. In addition, the employee is required to report for the immediate treatment of any injury he may receive while at work. The necessity for promptness in the treatment of injuries as an essential in the reduction of lost time accidents is quite thoroughly understood and practiced by all employees. In addition to the above service, a professional visiting nurse is also employed. The assistance rendered by the nurse is of both professional and practical value and is available to the employee and his family.

It is a well known fact that a man's mental attitude on the job greatly influences his ability to produce safely. Trouble or dissatisfaction off the job is apt to make him accident-prone on the job. In recognition of this fact, the company has been extremely generous in sponsoring, in whole or in part, a wide variety of wholesome recreational activities calculated to pleasantly and inexpensively occupy the leisure time of all employees and their families who desire to participate.

A spacious club house, known as the Utah Copper Club, is provided, which has facilities for bowling, basketball, billiards and badminton. In its auditorium, socials such as dances, vaudeville entertainments using local talent,

and other attractions are regularly held. A well maintained community park which is nearby provides tennis courts, swings, wading pools, a baseball diamond with a grandstand, a

golf course, and a park club house in which various entertainments can be held. Both the community park and the Utah Copper Club provide amusement and entertainment for thousands of employees and their families each year. A playground and a modern swimming pool are maintained at the nearby town of Garfield. Good fishing, picnicking, trapshooting, boating and hunting is to be found at the Utah Copper Fish and Duck Club located on a small fresh water lake about five miles from the plants. Each year if possible a field day is held at one of the nearby resorts to provide an outing, principally for the employees' families, at which concession facilities are free to them. Other attractions are to be had, furnishing a well-rounded recreational program capable of satisfying the most varied tastes.

An interesting safety stimulator has been a cash contribution by the company for each no-accident month. This "No Accident Fund" belongs to the men and is dispensed by them through the General Safety Council. Worthy projects such as community hospital beds and wheel chairs, financial aid to those off work because of extended illness, contributions to worthy charitable drives, prizes for safety slogans and suggestions, and many others are sponsored with this fund. Striving to increase this fund by accident prevention is a constant reminder to many to work safely each day.

Safety and the War Effort

Even before Pearl Harbor Utah Copper Company had greatly increased its production. Since the entry of the United States into World War II, and in response to the even greater need for copper, production has

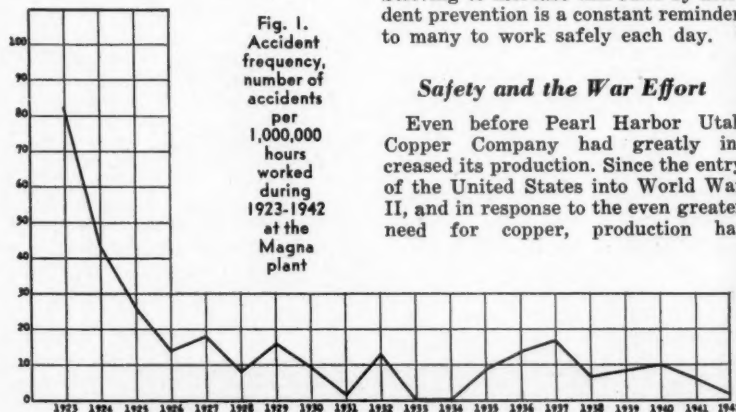


Fig. 1. Accident frequency, number of accidents per 1,000,000 hours worked during 1923-1942 at the Magna plant

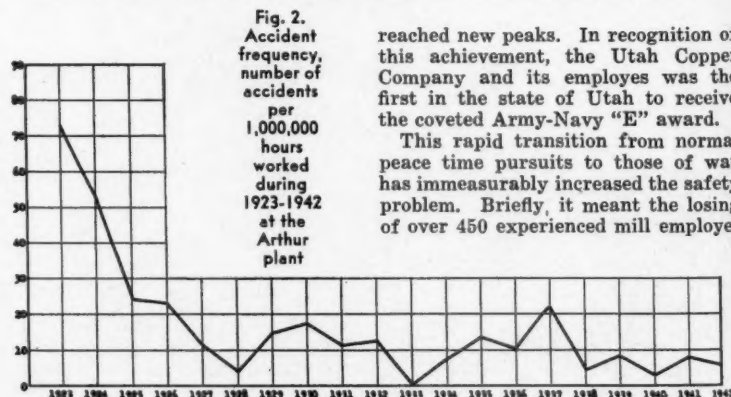


Fig. 2. Accident frequency, number of accidents per 1,000,000 hours worked during 1923-1942 at the Arthur plant

reached new peaks. In recognition of this achievement, the Utah Copper Company and its employees was the first in the state of Utah to receive the coveted Army-Navy "E" award.

This rapid transition from normal peace time pursuits to those of war has immeasurably increased the safety problem. Briefly, it meant the losing of over 450 experienced mill employees

to the armed forces, additional men to other new and essential industries, and the breaking-in of new and inexperienced replacements. It meant harder work with dangers of fatigue, plus the hazard of worry resulting from transportation, housing and other off the job problems. It meant a shortage of parts, machines, and materials, and rush repair and maintenance jobs. These elements and many others all combine to increase accident possibilities.

The challenge of war to the Utah Copper Company mill safety program has thus far been successfully met as indicated by a comparison of the plant accident figures for 1941 and 1942. During the first full year of the war both plants succeeded not only in reducing the number of lost-time accidents but also reduced the frequency and severity rates over those of 1941.

During the year 1942 each plant far exceeded its best previous continuous no-accident record for total man-hours of exposure. The Magna plant, according to National Safety Council figures, surpassed by 71,605 man-hours the best previous known record made by a plant in the milling section of the non-ferrous metals industry. To establish that record the Magna plant operated without a disabling accident from February 13, 1942, to November 17, 1942, or 277 consecutive days with an average force of 889.5, working a total of 2,003,776 man-hours of exposure in the milling of 12,836,800 tons of copper ore. The Arthur plant, in operating 228 consecutive days without a disabling accident, was not far behind Magna in its best effort for the year. This record started on April 27, 1942, and continued to December 11, 1942, with an average force of 784.3, working a total of 1,433,792 man-hours of exposure in the milling of 10,661,000 tons of copper ore. These

TABLE I
COMPARATIVE ACCIDENT FIGURES FOR 1941 AND 1942

Plant	Number of Accidents		Frequency Rates		Severity Rates	
	1941	1942	1941	1942	1941	1942
Arthur	17	12	7.54	5.26	2.94	.357
Magna	14	4	5.98	1.53	.82	.30

TABLE II
COMBINED ARTHUR-MAGNA ACCIDENT FIGURES FOR 1941 AND 1942

Fatalities		Permanent Partials		Number of Accidents		Time Charges Perm. Par.		Total Time Charges		Freq. Rate		Sev. Rate	
1941	1942	1941	1942	1941	1942	1941	1942	1941	1942	1941	1942	1941	1942
1	0	4	4	81	16	1560.3	815.5	8559.3	1699.3	6.75	3.27	1.86	.33

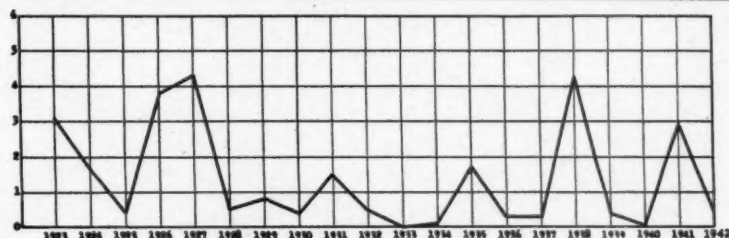


Fig. 3. Accident severity, days lost per 1,000 hours worked during 1923-1942 at the Arthur plant

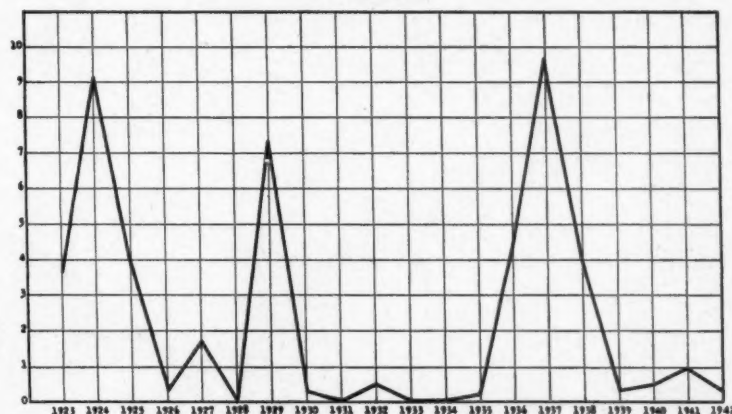
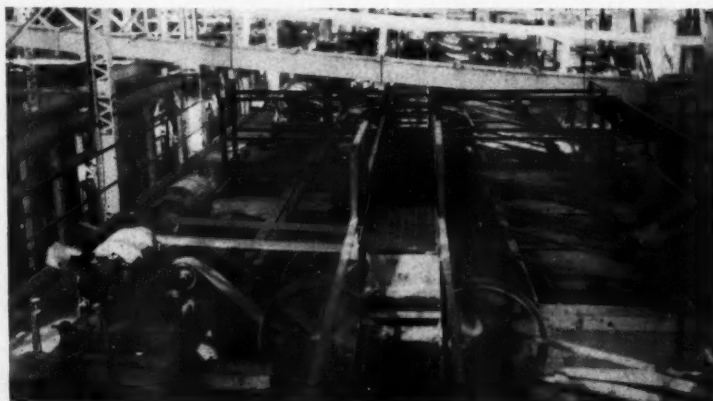


Fig. 4. Accident severity, days lost per 1,000 hours worked during 1923-1942 at the Magna plant



A view of the secondary drag classifiers in the ball mill grinding department. The walkways and hand rails over the moving machinery are well lighted and free from obstruction

accomplishments during wartime pay high tribute to the safety consciousness of Utah Copper mill workers, and if the experience of the first three months of 1943 is an accurate measure, the mills are assured of another banner safety and production year.

The success of any safety program cannot be credited to an individual or to any single effort, but to the combined and coordinated efforts of management, supervisory, and operating force. The Utah Copper plan of accident prevention embodies such a relationship between employer, foreman, and employee, so that continued improvement and success is anticipated.



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Any coal producing executive who is interested in improving the quality of his product will find this book of real value. We will gladly send you a copy—write for Bulletin No. 160—no charge of course.



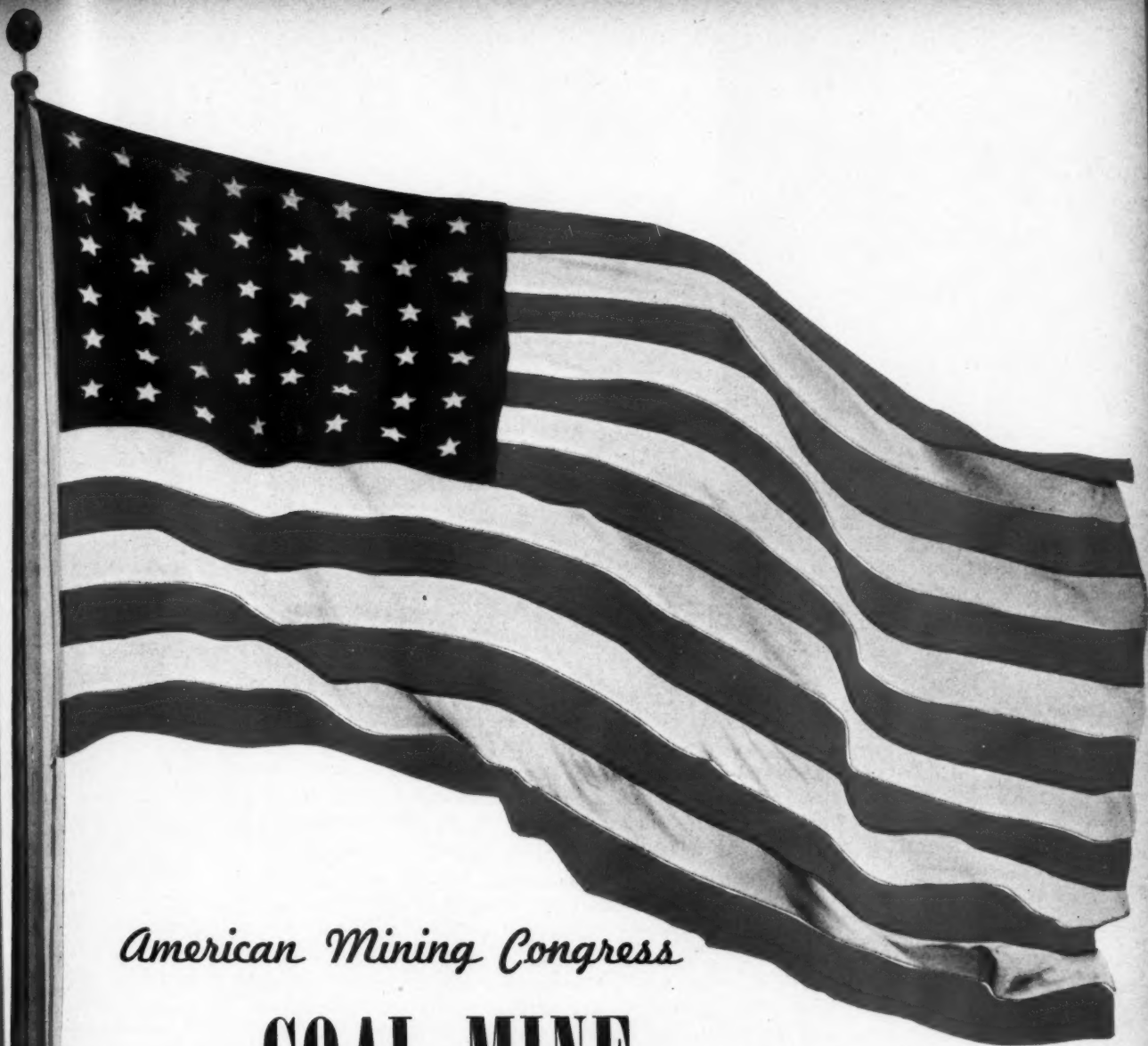
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American Mining Congress

**COAL MINE
WAR CONFERENCE**

NETHERLAND PLAZA HOTEL - - CINCINNATI, OHIO

July 19-20





GEORGE F. CAMPBELL

Vice President, Old Ben Coal Corp.

National Chairman, Program Committee

DURING THE PAST two months the situation within the coal industry has to some degree forced our attention from problems of production but it has not detracted from the importance of these problems. Regardless of controversies our national security demands that the mines must run and must reach the production goal set for 1943; in this respect the situation has not changed from that of three months ago when the program for the War Conference was formed.

The success in reaching our 1943 goal will be directly measured by our success in coordinating the many phases and details of production and supply. The Coal Mine War Conference at Cincinnati is a general staff meeting of the coal industry to consider how we can carry out the job that lies before us. The subjects to be discussed there were selected by the Program Committee at a series of meetings held in various coal centers, and great care was given to the preparation of a program which would best serve the war effort.

On behalf of the Program Committee and on behalf of the men who have given their time and thought to the preparation of the papers, I sincerely urge executives, operating and purchasing personnel and equipment manufacturers of the coal industry to meet together at the 1943 Coal Mine War Conference and help solve the pressing problems which will be presented for discussion.

National Chairman, Program Committee

Make Up That Lost Production

● That's the Coal Industry's Problem at the 20th Annual Coal Convention

AMERICA'S COAL MINING industry had a worldwide publicity during the last two months because coal mine labor leaders had said miners would not trespass upon the mining properties without a new labor contract. During this time millions of tons of coal have been lost to the nation's war program and operations of virtually all the nation's coal mines have been catapulted directly into the jurisdiction of the Federal Government. Precious time has been wasted. Millions of tons of coal must be mined between now and the year's end to make up for the loss due to the work stoppages.



CARL E. NEWTON

As a result, the industry's burden of wartime difficulties has been vastly increased, but it looks ahead with hope that its responsibilities to the nation's war program will be fulfilled. Coal mining has its perennial headaches but thus far has always succeeded in getting the job done. In the face of their new and difficult problems coal mine operators will meet and seek ways and means to obtain greater production. The 20th Annual Coal Convention of the American Mining Congress, on July 19-20 at the Netherland Plaza, Cincinnati, Ohio, will afford the opportunity to confer and discuss these new problems at a two-day meeting which will be devoted strictly to business.

Carl E. Newton, the new Deputy Federal Coal Mine Administrator, will attend the two-day meeting and will also be a guest speaker with Honorable John V. Forrester, Under Secretary of the Navy, at the annual dinner Tuesday evening.

Leaders of the industry will be present to discuss and point out the steps necessary to increase manpower, conserve machinery and equipment and help with other important requirements for complete capacity production. High-ranking Government officials will address the conference on the overall pattern of the war program and the Government's plans with respect to continued efficient functioning of the industry. The first general ses-

sion on Monday, July 19, will be devoted to the problem of manpower. Charles M. Hays, General Counsel, War Manpower Commission will make an address and an opportunity for open discussion in question and answer fashion will be afforded those attending. Among the mine operators representing the leading coal producing sections of the nation who will advance their views will be: Eugene McAuliffe, president, Union Pacific Coal Co., Omaha, Nebr., who will point out the seriousness of the coming coal famine next winter in the growing industrial Pacific Coast States; F. S. Pfahler, president, Superior Coal Co., Chicago, Ill.; R. E. Salvati, vice president, Island Creek Coal Co., Holden, W. Va., and Walter F. Schulten, assistant to president, Pittsburgh Coal Co., Pittsburgh, Pa.

At the Monday luncheon an outstanding army official will deliver an address on the military situation in our far-flung battlefields.

The Program Committee has carefully analyzed the numerous operating difficulties of coal mining in wartime, and has selected a group of speakers who have had wide experience in the industry. Their respective papers will deal with typical operating problems which have arisen during the war. Two sessions will be held each afternoon, one devoted to underground coal mining and the other to strip mining. The full program appears on page 25.

The shortage of fuel oil on the eastern coast is expanding the markets for the coal mining industry, and realizing the importance of this new trend, it is preparing to hold these markets in peacetime. Operators will be brought up to date on this vital subject during the general session Tuesday morning.

(Continued on page 28)



HOWARD I. YOUNG



A. S. KNOIZEN



HARRY M. MOSES

President, H. C. Frick Coke Co.
Chairman, Coal Division

IT IS A fortunate thing for our country today that the coal mining industry started to modernize its operations twenty years ago, for, without the use of machines, it is hardly possible that an adequate tonnage of coal could be produced to meet the present war needs. Mechanization grew slowly until the last five or six years, when it has made a rather spectacular advance, but both the early and the later progress has been due primarily to the fact that during these twenty years mining men have grown to accept the idea of combining their experience in working out technical problems.

Various means have been used to collect and disseminate information, such as published articles, sectional and local institutes, etc., but perhaps the greatest contributing factor in the development and adoption of new techniques has been the annual Cincinnati meeting of the American Mining Congress. It is the only meeting where men from all branches of the industry—bituminous and anthracite, operators and manufacturers, deep mining and strip mining—are brought together for a discussion and solution of their common problems.

The 1943 War Conference is of special importance, as there are so many new problems which have been brought about by wartime conditions. There is no time today for exhaustive trial and experiment—a quick solution is needed, and with this thought in mind, I wish to urge all who can—operators and manufacturers—to meet at Cincinnati in a concerted effort to answer some of the perplexing questions which confront us.

Harry M. Moses
Chairman, Coal Division

Program

MONDAY, JULY 19

10.00 A.M.—General Session

Opening of Conference

The Manpower Problem

Outlining the Personnel Situation in the Coal Industry.

CHARLES M. HAY, General Counsel, War Manpower Commission.

This address will be followed by speakers from the coal industry outlining the employment situation in their fields.

WALTER F. SCHULTEN, Asst. to Pres., Pittsburgh Coal Co.—Pennsylvania.

R. E. SALVATI, Vice Pres., Island Creek Coal Co.—West Virginia.

F. S. PFAHLER, Pres., Superior Coal Co.—Illinois.

EUGENE McAULIFFE, Pres., Union Pacific Coal Co.—Rocky Mountain.

12.30 P.M.—Luncheon

The Military Situation

A discussion of the activities and progress of our armed forces in the various combat zones by an outstanding officer in the U. S. Army.

2.30 P.M.—Deep Mining Session

Reducing Delays in Machine Operation

Maintaining Equipment for Sustained High Production

A. K. HERT, Gen. Mgr., Snow Hill Coal Corp., Terre Haute, Ind.

Organizing For Increased Production

Problems Arising from Shortages in Men and Material

J. M. JOHNSTON, Vice Pres., Bell & Zoller Coal & Mining Co., Zeigler, Ill.

Conservation of Labor

Improved Practices to Save Man-Hours Underground

C. C. HAGENBUCH, Chief Mng. Engr., Hanna Coal Co., St. Clairsville, Ohio and

FRANK G. SMITH, Gen. Supt., Sunday Creek Coal Co., Nelsonville, Ohio

2.30 P.M.—Strip Mining Session

Strip Mine Haulage

Experiences with Two Methods—Rail and Truck

C. W. WOOSLEY, Gen. Supt., Pyramid Coal Corp., Pinckneyville, Ill.

Maintenance and Repair in Wartime

Problems in Conditioning Strip Mining Equipment

W. B. PRATT, Treas., Dakota Collieries Co., Minneapolis, Minn.

Electrical Controls on Late Model Shovels

Installations with Modern Type Regulators for Shovels and Draglines

LESTER E. BRISCOE, Elec. Engr., Ayrshire Patoka Collieries Corp., Oakland City, Ind.

TUESDAY, JULY 20

9.30 A.M.—General Session

Quality Coal For War and Postwar Markets

Preparing Coal for Increased Industrial and Domestic Use

E. R. KEELER, Pres., Franklin County Coal Corp., Chicago, Ill.

Public Relations

Creating a Better Public Attitude Toward Coal

EDWARD H. WALKER, Dir. of Public Relations, Anthracite Industries, Inc., New York, N. Y.

Conservation of Material

Increasing Service Life of Machines and Equipment

JOSEPH PURSGLOVE, JR., Pres., Cornell Coke Co., Morgantown, W. Va.

9.30 A.M.—Purchasing Personnel Round Table

A special meeting arranged to give coal company purchasing agents and their staffs the opportunity to discuss their own particular problems and procedures with Director A. S. Knoizen of the WPB Mining Equipment Division.

12.30 P.M.—Luncheon

Assisting the Mines to Maintain Full Production

HOWARD I. YOUNG, Director, Mineral Resources Coordinating Division, War Production Board

Coal for War

T. J. THOMAS, Director of Production for Coal Mine Operations, Department of the Interior.

Machinery and Equipment for Coal Mining

Discussion of the Industry's Current Problems of Materials Procurement

ARTHUR S. KNOIZEN, Director, Mining Equipment Division, War Production Board

2.30 P.M.—Deep Mining Session

Removing Seam Impurities Underground

Supplementing Surface Cleaning by Face Preparation

JOHN J. SNURE, Asst. Production Mgr., Rochester & Pittsburgh Coal Co., Indiana, Pa.

Safety in Wartime Mining

Reducing Accidents Arising from High-Pressure Operation

E. R. PRICE, Gen. Supt., Inland Steel Co., Wheelwright, Ky.

Coal Dust Control Underground

Methods to Reduce Hazards from Coal Dust

RODNEY H. HONAKER, Safety Dir., Guyan Eagle Coal Co., Amherstdale, W. Va.

2.30 P.M.—Strip Mining Session

Stripping With Draglines of Three to Nine Yard Capacities

Methods with Small Capacity Equipment

HARRISON EITELJORG, Gen. Mgr., Morgan Coal Co., Indianapolis, Ind.

Moving Overburden With Large Draglines

Equipment with from 10 to 25 Cu. Yd. Capacities

T. H. LATIMER, Engr., United Electric Coal Co., Chicago, Ill.

2.30 P.M.—Manufacturers Meeting

An open meeting of the mining manufacturers with officials of the WPB Mining Equipment Division, for discussion of allotments, equipment scheduling and general problems of mining manufacturers under CMP controls. A question-and-answer session to facilitate service to the mining industry.

7:00 P.M.—ANNUAL DINNER

Toastmaster

IRVIN DAVIS, President, Hatfield Campbell Creek Coal Co.

Guest Speakers

CARL E. NEWTON, Deputy Federal Coal Mine Administrator

HON. JAMES V. FORRESTAL, Under Secretary of the Navy



JOHN W. HADDOCK

Vice President, Sullivan Machinery Co.
Chairman, Manufacturers Division

THE PAST YEAR has tested the relationship to the American Mining Congress of the manufacturers of mining machinery and supplies. The Manufacturers Division has met this test and is today stronger and more effective than ever before with more than double the previous membership.

It has been inspiring to see the demonstrated confidence of manufacturers in the value to them of the Congress. It has been equally heartening to see the strength and influence of the Congress used so effectively on behalf of the manufacturers.

Once again there has been proof of the mutuality of interest between operators and manufacturers who are equally a part of the mining industry. Never has there been greater need of those activities which only the Congress can perform, and never has the Congress more completely demonstrated its value and effectiveness.

The manufacturers are determined that the Mining Congress shall be maintained in all its strength and vigor.

John W. Haddock
Chairman, Manufacturing Division

MANUFACTURERS DIVISION

AMERICAN MINING CONGRESS



*Allis-Chalmers Manufacturing Company
 *American Manganese Steel Div. of
 American Brake Shoe & Foundry Co.
 American Brattice Cloth Corporation
 *American Car & Foundry Company
 *American Cyanamid & Chemical Corp.
 American Mine Door Company
 Anaconda Wire & Cable Company
 *Atlas Powder Company
 Barber-Greene Company
 *Bethlehem Steel Company
 Bixby-Zimmer Engineering Company
 Bowdil Company
 Broderick & Bascom Rope Company
 *Brown-Fayro Company
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 *Central Frog & Switch Company
 Centrifugal & Mechanical Industries, Inc.
 Chicago Pneumatic Tool Company
 Cincinnati Mine Machinery Company
 Cities Service Oil Company
 Clarkson Manufacturing Company
 Cleveland Rock Drill Company
 *Cutler-Hammer, Inc.
 Deister Concentrator Company
 Differential Steel Car Company
 Duff-Norton Manufacturing Company
 *E. I. du Pont de Nemours & Co., Inc.
 *Thomas A. Edison, Inc.
 Eimco Corporation
 *Electric Railway Equipment Company
 Electric Storage Battery Company
 *Enterprise Wheel & Car Corporation
 *Fairbanks, Morse & Company
 Flood City Brass & Electric Company
 Gardner-Denver Company
 *General Electric Company
 *Goodman Manufacturing Company
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 Harnischfeger Corporation
 *Hendrick Manufacturing Company
 *Hercules Powder Company
 *Hockensmith Wheel & Mine Car Company
 *Robt. Holmes & Bros., Inc.
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 Ingersoll-Rand Company
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 *National Carbon Co., Inc.
 National Electric Coil Company
 National Malleable & Steel Castings Co.
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 *Westinghouse Elec. & Mfg. Company
 West Virginia Rail Company



A. K. HERT



E. R. KEELER



JOS. PURSGLOVE, JR.



HARRISON EITELJORG



JOHN J. SNURE



J. M. JOHNSTON

Speakers



RODNEY H. HONAKER



FRANK G. SMITH



W. B. PRATT



LESTER E. BRISCOE



E. R. PRICE



C. C. HAGENBUCH



C. W. WOOSLEY

(Continued from page 23)

Two papers, one dealing with quality coal for war and post-war markets, and the other explaining the importance of creating better public attitude toward the use of coal, are most timely. A third will discuss means of increasing the service life of machines and equipment.

Coal company purchasing agents and their staffs will also have an opportunity to present their particular questions to Director A. S. Knoizen of WPB's Mining Division at a round-table discussion to be held Tuesday morning.

The President of the American Mining Congress, Howard I. Young, now Director, Mining Resources Coordinating Division, WPB, will be present to address the luncheon gathering on Tuesday on the matter of "Assisting the Mines to Maintain Full Production." Mr. Young's many years of experience with the numerous

problems of the entire mining industry qualified him for his new duties in which the coal industry is receiving close attention. "Coal for War" will be the subject of an address by T. J. Thomas, Director of Production for Coal Mine Operations, and Arthur S. Knoizen, Director, Mining Division, War Production Board, will discuss the subject, "Machinery and Equipment for Coal Mining."

Manufacturers serving the coal mining industry will meet with officials of the Mining Division Tuesday afternoon for discussion of allotments, equipment scheduling and general problems of mining manufacturers today.

The War Conference will close with an informal banquet Tuesday evening, at which time Carl E. Newton, Deputy Federal Coal Mine Administrator, and Hon. James V. Forrestal, Under Secretary of the Navy, will be the guest speakers.

Preview of the Program

Reducing Delays in Machine Operation

*If your company lost 53,000 minutes
through small delays in mechanized mining,
Uncle Sam's Army lost an equivalent of
53,000 two-ton block busters*

By A. K. HERT

General Manager
Snow Hill Coal Corporation

FROM an Eastern seaport on a given day in November, 1942, an American convoy steamed out of the harbor bound for a port somewhere in North Africa. The invasion of North Africa was at hand. Delay in carrying out any part of these well laid plans would have been fatal to the invasion. The precision with which they were carried out indicates the necessity of many weeks of detail planning in order to achieve such an overwhelming victory over the Axis.

You may well wonder what connection the above story has with the subject of reducing delays in machine operation. I want to emphasize the effect of delays, whether they be in military operation or whether they be met in a coal mine. The whole North African invasion was based on a time table. In a similar way our coal mines operate on a time table. We measure the efficiency of our mines or a piece of machinery in that mine by the ratio between its actual operating time to the maximum time per shift.

Therefore, we in the coal industry are vitally concerned with the necessity of eliminating, or reducing to a minimum, the causes of delays.

In that unforgettable year 1941, the coal industry produced 514,149,006 tons of coal. In 1942, we produced 580,000,000 tons and in 1943, our Government has requested that our goal must be 650,000,000 tons. The production of this tonnage is a Herculean task when we consider how we are limited in the supply of new equipment and our depleted resources of manpower. Some of our most severe losses of manpower have occurred in our maintenance crews.

Mines in peace time averaged about four operating days per week. Today they operate six days per week. This means an increase of 50 percent in the working time of our equipment. This imposes a great strain on the maintenance department, because machinery is wearing out faster, and the chance for breakdowns and delays are increased in direct proportion.

In peace time we are concerned most with the effect of delays on our cost sheet. In time of war there is added the incentive of utmost patriotism in the coal mining industry to help our country fight our enemies. When we stop to consider the causes of delays in our mines we find that these causes

extend from the face of the coal seam to a point somewhere beyond the surface installations. We could theorize without limit on the multitude of possibilities causing delays in machine operation, and still not have the actual concrete facts before us. We can, however, catalog the known delays and their causes in our respective operations.

The lost-time report for the year 1942 of a large midwestern mine discloses some very interesting facts as to delays, their causes and points of attack for correction. This company has kept an accurate record of all lost-time on their loading machines. A separate report showing such delays is turned in by the face boss in charge at the end of each shift. Causes of delay and time lost are shown on this report. These delays are listed under the following headings: Waiting on Cars, Wrecks and Derailments, Power Interruptions, Electric and Cable, Machine Repair, and Miscellaneous. The percentage of time lost to the total time worked for the entire year 1942 on seven loading machines was 7.84 percent or 53,158 lost minutes. Reducing this to loading machine shifts we find that approximately 127 shifts of seven hours were lost, costing our country about 53,000 tons of coal so vital to the war effort. (One half ton of coal is reported equivalent to one 2,000-lb. aerial bomb.)

This figure of 7.84 percent lost time to total time worked is of special significance when broken down into its elements. Here it is found that 48.74 percent of total time lost is in waiting on cars; 3.16 percent because of power

interruptions; 8.74 percent through electrical and cable trouble; 20.62 percent for machine repairs and 8.85 percent due to miscellaneous causes. Some of these items are so small as to warrant little consideration. It is in the larger items that hope for correction is most encouraging. Practically one-half of the total time lost by these machines is due to waiting on cars.

The next greatest delay is machine repair. The weaknesses here might be in the lack of expertness or carefulness of the machine operator, face preparation, method and manner of servicing, provision of spare replacement units to allow periodic overhauling, scarcity of skilled mechanics, etc.

The two causes mentioned above amounted to approximately 70 percent of the total lost time suffered by this mine, and therefore offered the most promising places for improvement. Acting upon these data, this company has been able to reduce their lost time in spite of steadily increasing tonnage.

Comprehensive studies of delays might reduce the total time lost by at least 10 percent. In the case of this operating company, a 10 percent reduction of lost time would have resulted in a saving of 5,315 production minutes. If we should ask the face boss in charge of one of these seven units, to assume the responsibility of saving his proportion of this time, he would be astonished, when informed that he was faced with the insignificant task of keeping his machine in productive operation only 3.3 minutes more each day in 1943 over his performance of 1942.

This small saving might easily be found in a low place in the track or the machine jack that was thoughtlessly left lying in the last breakthrough, the extra fuse forgotten by the service crew, in a room carelessly timbered, in the tool that was covered up. When we think of the hundreds of places on a loading section where time may be saved, we blush with shame because we have suggested the saving of so little.

The seven machines upon which this study was based, contributed a very small percent of the total tonnage produced in this country last year. Assuming time lost at this mine as being indicative of the time lost over the entire industry regardless of the method of production, the total tonnage lost due to delays in 1942 amounted to an excess of 50,000,000 tons. To reduce this by 10 percent would result in a recovery of more than 5,000,000 tons without the aid of a single loading machine unit or the addition of an extra man.

It is intended to outline any specific program of machine maintenance, because we realize that each mine has a separate problem of maintenance and that there is no single method which can be applied to all mines, except that of good management. It goes without saying that the managements of the coal mines of Germany and Japan are exerting themselves to the utmost, not only to maintain production, but to increase it. The coal mining industry of the United States can do no less.

production but wartime conditions virtually prohibit application of these conventional methods.

In mechanical mines the problem is more serious and complicated. As in the case of the handloading mine, only older men are available for replacements in the mechanical mines. Some of these replacements have not worked in the mines for several years and some are beyond what was normally considered the age limit for certain jobs. However, when given an opportunity, older men do have an added incentive to make good on their jobs because, to most of these men the new job is another chance to become self-supporting and they make every effort possible to do their respective job.

Present Emergency Presents Many Operating Problems

The producer who has converted his mine from hand to mechanical loading must meet his problems with the same fortitude with which he solved the many difficulties involved in changing over the system of mining when loading machines were first introduced into his mines. The initial change-over generally meant new ventilation problems, new haulage problems, changes in shooting methods, additional equipment and extensive changes in operating methods underground as well as installation of additional facilities for preparation and cleaning. After several years of mechanical operation, all of these problems are solved or in various stages of consideration for improvement and now we are confronted with an entirely new set of problems which, under present circumstances, must be solved to meet the existing emergency.

Organization of operating crews depends to a large extent on the number of men leaving the mines, the classifications losing the most men and the men available for replacements. Virtually all able-bodied men under 38 years of age have now been drafted into the armed forces and mine officials have a large job ahead of them during the next few months in arranging workmen into efficient production units.

It is our experience that the loading machine operators who have been in our employ for a number of years, and are, in most cases, above the age specified by army regulations. Where this condition exists, the problem of organizing crews becomes more simplified because around a good operator you can build up a crew from average workmen who will produce a fair to good tonnage. Place as few new men in any one crew as is possible so they can be taught their job in the least possible time and give the new men all the assistance and advice necessary to get them properly adjusted to the working habits of the other members of the crew. Educating the new men

Organizing For Increased Production

Every operating official in the country is on the alert to develop methods which will supply all the coal needed for the war program

By JOHN M. JOHNSTON

Vice President
Bell & Zoller Coal and Mining Co.

SOME OF US have been fortunate enough, until recently at least, to have had a sufficient number of new applicants who have had mine experience to replace those men who have left our employ. Others have already felt the weight of carrying along inexperienced men who are generally older than the men they are hired to replace. In hand loading mines, it is always possible to increase the production by

adding more men. Only older men are now available, but they are still capable of doing a fair day's work and in many cases are willing workers.

Stepping up production in the usual operation of a coal mine under normal conditions calls for opening up new territories, purchasing new equipment and machinery, moving up partings and hiring new men. Our present problem, however, demands greater

takes various forms of procedure and the many personalities involved demands the careful study of each individual case.

When a new employe receives his check number at our mines he has already signed a check-off allotment for War Savings Bonds and has equipped himself with a hard hat, safety shoes, and goggles. With these he is ready to take his place with us in doing our share to build up the nation's coal pile.

We know there are many good loading machines, cutting machines, and drills which have proved their ability to stand up and produce coal consistently, day after day. Weak points in the machines have been re-inforced and re-designed until the machines of today are capable of handling large tonnages with very few mechanical delays. The manufacturers have done a good job but are now in war production also. Repair parts and supplies are difficult to get. Management must look further into the future for those items ordinarily available on short notice.

Mine managers and foremen must be men of wide experience in the different methods of mining and a working knowledge of various types of equipment. They must also be men who have the ability to get along well with other men and they must have the ability to induce the men working for them to do willingly whatever the foreman wants to be done.

Manpower Turnover is High But Production Steady

During the past year we have lost and hired 258 men. Our total number of men employed at Zeigler is 1,264. With a turnover of 20.4 percent in manpower, we would expect an unfavorable reflection in the production record but at our Zeigler properties the production in tons per man shift showed an increase in December, 1942, of 8 percent above that of December, 1941. Our neighbors in the Southern Illinois field have had about the same experience.

The percentage of men leaving the mines will probably not be so high this year as it was last year but the replacements will no longer be so readily available. Just what the future requirements will be will depend, of course, on the number of men required in our war effort.

We are all interested in high tonnage, and high tonnage is important but other operating items must be given their full share of consideration if the production program is to be successful. Production thinking must be coordinated with costs and safety. It is not possible to continue for any great length of time without giving thought to the combination of these

three items and the company that stresses tonnage and forgets costs and safety will soon have a property for sale.

When organizing for increased production I would place in one of the topmost positions of importance the safety engineer. A competent safety engineer is indispensable to the operating department. His daily inspections of working sections of the mine; pointing out unsafe practices and examining natural conditions keep the safety idea before the employes at all times. Many serious losses or accidents have been prevented or avoided because the safety engineer had passed through a working area and found the hazardous condition or operation.

Cost figures of production in detail, are the most important figures on the desk of any mine operating official. With an accurate cost statement broken down to cover all items of expense the mine operator is prepared to analyze his operation and find out how well the different sections of the mine are producing.

The foreman's attention should be called to items exceeding the average for his territory so these can receive his immediate attention. Such increases may require the assistance of the mine manager in finding the cause. Each foreman can compare his costs with those of other foremen in the same territory and if there are sizeable differences, get after the reasons for them. Also a comparison of his own previous records will often be of value to the foreman. It is essential that he know his costs because the real responsibility for most of the cost of coal is dependent upon the foreman directly in charge of "men at the face." His job well done keeps the costs where they show efficient operation.

Every mine manager, foreman, and assistant foreman realizes the value of complete reports from which the management can develop its operating policy and give them assistance in their work and in the planning of future developments.



This maintenance man carefully investigates the condition of motors and cables



Maintenance of operating equipment becomes more and more important as we go along. The increased production naturally wears down the machinery at a faster rate. That predetermined tonnage at which machines were usually brought out to the shop for overhauling should not be increased if you want to continue producing. Close scrutiny of the more recent records of machine failures will help determine the repairs to be first expected. Current records of all machine failures must be correct in every detail. Each loading machine foreman making a report each day to the maintenance supervisor showing delays to his loading machines, locomotives, cutting machines, and drills should include every item causing the slightest delay. These delays are checked with the repairman's report and a complete delay chart assembled into one simplified form and posted so the mine manager, all foremen and maintenance men can see it.

Our records show that for the past three years all electrical and mechanical delays to our face equipment, e.g., the loading machines, locomotives, cutting machines, drills and trailing cables add up to less than 1 percent of the operating time of the equipment. We think this is a real good record and feel that our maintenance department is functioning satisfactorily when lost time due to failure of the face equipment does not exceed 1 percent.

Organizing for increased production is, as I view it, a job directly in the hands of the officials and supervisors. Perfect teamwork, that of giving and passing on helpful and detailed information will get results. Suggestions from every operating man in the organization must be given consideration. The suggestions themselves may be of value, as well as the feeling they promote in the individual, that he is part of the business rather than just a hired hand. Having a part in the plans of operation develops the native capacity of the individual foremen who are eager to improve their ability and their jobs.

Conserving Labor By Preventing Roof Falls

Experience to date shows that mine roof sealing, where successful, is definitely beneficial in saving both material and labor

By FRANK G. SMITH

General Superintendent
The Sunday Creek Coal Company

UNTIL RECENTLY, the fact that roof would fall has been accepted as inevitable and conventional methods of permanent timbering have been applied. In the majority of cases this has been left to the judgment of the mine foreman and no very detailed or scientific investigation of the actual causes for roof failure has been made. True, it has been known that roof failed for one or a combination of three primary reasons. These are: first, structural weakness; second, stresses inherent in the roof strata which show up when exposed by extraction of the coal; and, third, weathering. However, the real underlying causes back of these factors have not generally been thoroughly investigated. This is particularly true in the case of weathering.

Even the most casual observation tells us that certain types of shale are subject to severe deterioration from weathering. On the other hand, in relatively few cases is a definite and thorough investigation into the character of these shales made. We do not always know whether, for instance, the weathering is primarily a result of the absorption of moisture, swelling caused by temperature change or the oxidation of certain minerals in the shales, or a combination of these causes.

Generally, the solution to this type of roof problem has been heavy timbering including lagging to combat constant and gradual deterioration, or by guniting. This latter has been successful in a large number of cases, but also a failure in a number of others. Sometimes failure has occurred in instances where the shales were apparently similar to others where this process has been a success. In any event, the solution has been expensive.

In recent years some operators have experimented with "Mine Roof Sealing." Briefly, this method of mine roof treatment involves sealing or painting the roof with some preparation which protects it from the atmosphere. In some cases, asphalt and

water emulsions have been used, while in others various paint preparations using volatile solvents were applied. Obviously, such preparations have no structural strength, but can be made to provide an effective seal. The primary advantages lie in low cost of application, ease of application (more or less conventional sprays are used), and the fact that the preparation need not contain water. This last is a distinct advantage where shales deteriorate rapidly where even small amounts of water are present.

The Roof Action Committee of the Coal Division, American Mining Congress, has undertaken a study of this method of controlling roof. The approach made by the committee is largely investigative and based upon recognition of the fact that the first "must" is a thorough investigation into the character of roof and the causes of failure. Unless this is done, the chance of failure remains too great.

As a first step, a tentative classification of roof rocks from the standpoint of their deterioration was prepared. Its purpose is to serve as an aid in the study and description of roof samples. The work was done by Dr. A. J. W. Headlee, chemist, and Dr. J. H. C. Martens, mineralogist, of the West Virginia Geological Survey, and Dr. A. M. Miller, engineer, West Virginia State Road Commission.

Next, Dr. Paul H. Price, state geologist of West Virginia, and Dr. H. P. Greenwald, of the United States Bureau of Mines, with the other committee members developed a standard procedure for taking roof samples and a standard data sheet for reporting pertinent data concerning the operation, the coal seam, and the roof material under study. This data sheet was purposely designed along non-technical lines and avoided as far as possible questions requiring any specialized knowledge of chemistry or geology.

Roof samples which have been sent in have been analyzed along more or less standardized lines. First, a mineralogical examination has been made

to determine the chemical composition of the shales and their possible reaction to the various elements of the atmosphere.

Finally, on the basis of the information derived from the mineralogical investigation, the weathering tests are combined to determine the probabilities of success or failure with mine roof sealing. Where roof is stratified, some indication as to the particular stratum to which the sealing agent is to be applied is noted. Also, from these data it is possible to base the selection of the sealing material to be used.

It is not possible in the time available to go further into detail. However, I should like to direct your attention to an actual case study which is described fully in the April issue of MINING CONGRESS JOURNAL. In this particular case, the study of the roof shales indicated the sealing would be definitely beneficial. Experience at the particular operation involved, indicated that the roof on intake air-courses could not be easily controlled by conventional timbering methods. Slaking was more or less continuous, and haulage delays and choked air-courses resulted. Obviously, labor was used more or less continuously in what might be termed non-productive work. That particular installation is reported to be standing up in good shape although a sufficient time has not elapsed for a complete evaluation of the job.

Summary and Conclusions

Up to the present time, the procedure adopted appears to be adequate as a means of collecting advance information. Also, it would seem to lend itself to correlation as more data becomes available. Finally, it is not unduly cumbersome and is such that it does not give rise to problems beyond the scope of the operating organizations of small mines.

Enough data as to costs are not yet available to give definite figures. However, data on two specific installations might prove interesting. These are as follows:

	A. per sq. ft.	B. per sq. ft.
Scaling and Preparation, Labor....	\$0.010	\$0.080
Spraying, Labor....	0.010	0.010
Material	0.070	0.015
Supervision	0.015	0.015
Total	\$0.105	\$0.120

Both of the illustrations used resulted in a cost per lineal foot of between \$1.50 and \$2. These figures, it is hoped, will yield some general indication of the cost comparison with guniting or any specific timbering job. These examples are not considered to be unusual cases but represent a fairly average condition.

Labor Economies in Track Construction

Fabricated material has many advantages

By C. C. HAGENBUCH

Chief Mining Engineer
Hanna Coal Co., St. Clairsville, Ohio



A CONSIDERABLE portion of the cost of sectional mine track is charged to the labor of laying it. Labor which can be performed prior to the installation of the mine track and by methods more efficient and more economical than would be possible in the mines, would result in a decided saving in labor man-hours.

It is this reduction in man-hours which we wish to consider. Due to losing mine employees to the armed services together with labor's drift to war industries, we are all confronted with a reduced reservoir of manpower, together with a more inefficient labor force. As we lose our skilled workers we are forced to replace them with untrained labor that must be educated to the work which it is to perform. We are unable to present figures showing a comparison between skilled and unskilled labor engaged in track work but it has been estimated that the efficiency of mine labor has dropped 15 percent. Therefore, it goes without saying that man-hours employed on a job bring higher costs in proportion to the degree of inefficiency. If the installation of track is simplified then we have increased the output per man-hour of either skilled or replacement labor. Skilled track men are necessary to properly curve mine rail and cut same, while relatively untrained men can properly install a precurved rail.

Among the possibilities that present themselves in so far as service haulage tracks are concerned, is first the use of steel instead of wood mine ties. Consider the following time-study figures:

It requires 4.55 times as many man-hours to lay 40-lb. straight track on wood ties as it does on steel ties.

It requires 3.30 times as many man-hours to remove or recover this 40-lb. straight track from wood ties as it does from steel ties.

It requires 1.76 times as many man-hours to install a No. 2 turnout on wood ties as it does on steel ties and 1.45 times as long to recover it.

This shows a possible labor saving of 78 percent in installation and 70 percent in removal by changing from wood to steel ties under 40-lb. track.

Also there exists a possible labor saving of 43 percent in the installation, and 31 percent in removal when mak-

ing the same change under a No. 2 turnout.

The objection might be voiced by some operators that steel ties, particularly in entries, would not stand up under the constant and heavy use to which they need be subjected. To these operators we can suggest the advisability of using some type of combined wood and steel tie which has practically all the advantages of rapid installation and removal possessed by the steel tie.

Among the possibilities worthy of investigation are special self-contained joints permitting quick rail connections and easy recovery, prebent and precut rails and complete track systems including prefabricated turnouts and track designed and cut to fit specific mine layouts.

Savings Can Be Made in Track Construction

The Haulage Roads Committee of The American Mining Congress has recently completed a service haulage track study, report on which appeared in the June issue of THE MINING CONGRESS JOURNAL. The objective of this study was to indicate methods by which savings could be made in installing and removing entry and room tracks in panels operated by mobile mechanical loaders. Without examining the cost details of this report, which is available to anyone wishing a copy, it can be said that it shows a decided cost advantage which may be realized by the use of prefabricated track material, such as rails purchased to proper length to eliminate cutting, rails precurved to eliminate hand bending, welded joint construction, shop-assembled turnouts, etc. These reports consider the additional cost of the prefabricated materials and on the basis of man-hours required for each installation and removal throughout the life of a butt entry panel, show that despite the higher initial material cost a saving can be made because of the reduction in labor man-hours.

To illustrate the possible savings in man-hours it is necessary to consider three different classifications or methods of installation of sectional track; Class One—uses stock material en-

tirely with all labor of cutting and bending done by track crews.

Class Two—has the straight rails cut to predetermined lengths, the curved rails are prebent, and turnouts are manufactured knocked down.

Class Three—uses pre-cut and prebent rails, sectional fabricated turnouts and the angle bars and bolts are riveted or welded to the rail ends.

The studies cover three mining systems as follows:

System A—Room mining without pillar recovery.

System B—room mining with pillar recovery.

System C—block system with open and pillar recovery.

The results of the studies based on Class One being 100 percent shows that for System A man-hours employed decrease as follows:

Class One=100 percent. Class Two=84 percent. Class Three=76 percent.

For System B—

Class One=100 percent. Class Two=88 percent. Class Three=56 percent.

For System C—

Class One=100 percent. Class Two=80 percent. Class Three=75 percent.

To present the figures in a slightly different manner, it is possible for a mine now using stock track material and operating on a room system without pillar recovery to reduce its track labor by from 16 to 24 percent, through the use of prefabricated track material.

In a similar manner it is possible for a mine using a room mining system with pillar recovery to save from 12 to 44 percent of its labor.

The mine employing a block system with open and pillar recovery can reduce its track man-hours by from 20 to 25 percent.

To summarize the above figures, we can state that a mine now using stock track material may by shifting to prefabricated track material effect a man-hour labor saving ranging from 12 to 44 percent depending upon the class of prefabrication selected by the operator.

Strip Mine Haulage

To use rail or truck—that is the question

By C. W. WOOSLEY

General Superintendent
Pyramid Coal Corporation

THE PRO AND CON of truck or rail haulage usually leads to much discussion. There are many angles to be considered, and there are many merits as well as objections which can be advanced for either type of haulage. Any company faced with the haulage problem should devote a great deal of time and study to determine which system will best fit their plans.

I recall very distinctly a statement made several years ago at a Mining Congress Convention which impressed me very much, to the effect that "Efficient haulage and planned haulage are one and the same thing, and they don't just happen." That holds just as true today as then and will probably always be so. The cost of haulage is a very small percentage of the total cost at any mine, but well planned haulage systems will help considerably in the general all-around efficiency which is so vital today. The decreased hourly work day and the general marked increase in operating costs makes it necessary to watch not only haulage, but all other departments.

In years past, there were foremen who contended that as long as we had haulage, we would have wrecks. These men either changed their attitude or were replaced as the old methods gave way to modern practices. Inasmuch as we have both rail and truck haulage at different pits, I know of no better way to proceed than to give a few details of our experiences, based on an over-all period of a number of years.

Pyramid No. 1, which is now operating in its 17th year, was laid out for rail, using 36-in. gauge, 5-, and later, some 10-yd. dump cars and 25- to 30-ton locomotives. The conventional one-way rail into the pit, or single track, was laid with necessary back switches at the most advantageous points. We all know the disadvantages of that system, of which the greatest in time lost was the wait between each trip causing the loading shovel to be idle. This was partially eliminated by installing passing tracks wherever practical. Our time checks still showed a considerable loss of time between trips and we could advance no other worthy recommendation. Fortunately, the contour and general lay-out of our property was such that it lent itself almost ideally

for a circular haul. To install this required an incline at the back end of the pit for the empties going in and another incline for loads coming out, also track on top the entire length of the pit. We had satisfied ourselves that if permitted to make the circular installation, barring accidents, we should be able to maintain a steady flow of empties under the loader.

After much study with a lot of consideration given the heavy initial cost, we finally made the change in 1931. The results were very gratifying and we approached closely to the 100 percent shovel operating time for which we all strive. The efficiency of our loader was increased approximately 30 percent and resulted in greater output. Naturally the new set-up added to our track mileage considerably with the necessary increase in track crew, but it did eliminate all the back switches and passing tracks. The abandonment of these switches and passing tracks greatly decreased the amount of track work in the pit because only straight rail was laid or moved. We have eight locomotives in service traveling a maximum distance of eight miles per round trip. These units pull to the top an average of 1,200,000 tons annually under the present set-up.

Truck Manufacturers Contribute Much to Progress at Strip Mines

At our No. 3 pit, we first loaded directly into standard gauge railroad cars with the larger type standard gauge locomotives as motive power. This method was used for several years prior to 1935, and during that year we changed over to truck haulage. This installation was made after a year of checking various equipment and getting as much first-hand information as possible. Most of the actual data was obtained from one of the pioneering companies in heavy truck haulage being furnished by Messrs. Russell and Merle Kelce and men of their operating personnel. The truck manufacturers cited some wonderful records of motor and tire mileage, all based on hard surfaced roads and on long hauls. Motors that had traveled 100,000 miles with a minimum amount of trouble were common with several large companies having fleets doing heavy duty work.

The various parts that stood up well for thousands of miles on concrete and other hard surfaced roads were not designed to withstand the severe haulage conditions, at least, in our mine. I particularly remember springs—we bought them by the dozens to keep the fleet in operation. But by the gradual process of elimination, as each part failed, the manufacturer would replace it with stronger, and in some cases, differently designed part so that today with the proper supervision and maintenance, we can expect and do receive, remarkable service. I think all heavy duty truck manufacturers should be congratulated on the splendid record they made in constructive changes.

As I recall on some of our first units, tire mileage would reach the remarkable total of five or six thousand miles, and by that time there would be very little left of the original casing. The short life of tires, as well as motor failures, was not all due to the particular item for we subjected them many times, through ignorance, to a great deal of unnecessary unfavorable working conditions. Today with pit conditions as they are, we must average over 20,000 miles per casing and in a great many instances a 30,000-mile average is common. I am only relating the above to show what the truck and tire manufacturers have done to build a unit for a really tough job.

The units placed in service in 1935 were powered by gasoline motors. These were replaced in 1940 by diesel motors. Before making the change we contacted users of diesels and obtained as much information from operating data sheets as possible. In practically all cases, this type of motor showed excellent results and the performance we have received justified the change for they have certainly lived up to expectations. Although since their installation we have had an approximate 12 percent increase in contract labor cost, we have been able to show a reduction in the total haulage figure. However, with the change to diesels, we immediately ran into rear-end trouble. The additional power was too much but this was gradually changed to permit an uninterrupted day.

Regardless of what must be done, good roads are absolutely necessary and should in no case be neglected. The entire performance of good truck haulage depends on this item as much as any other phase of truck operation. Probably the worst punishment trucks receive is the travel on the coal. It is difficult and requires constant attention to maintain a suitable traveling surface on the coal bed. The cost factor enters into this considerably due to the fact that the road bed constantly changes from day to day. In a mine laid out for truck haulage, the stripping shovel can work on the edge

of the open cut farthest from the high wall which enables the shovel operator to place the spoil dirt most advantageously.

Generalizing on the two types of operation, I am of the opinion that in case of a long haul, the rail haulage would be the more economical operation, if the natural conditions are such that the rail haulage could be properly installed. And on the properties having shorter hauls, truck haulage would be the more economical if natural conditions are not prohibitive.

The dividing line at our properties in Illinois would be between three and

four miles round trip. Under this we would favor trucks, and over that distance, would favor rail. This might not apply, however, in other localities, as natural soil and contour conditions must be considered, as well as quality and quantity of available road building materials.

Notwithstanding the fact that wherever possible truck haulage has the first call and without leaving myself open to too much criticism I will state that we have been able to maintain cheaper haulage with rail than we have with truck. But it is probably accounted for by distances rather than the particular type.



Ingenuity On the Repair And Maintenance Front

Continued production by small mine coal operators requires a knack and a will to make all their machinery and equipment function for maximum output in the war program

By W. B. PRATT

Treasurer
Dakota Collieries

A CONTINUOUS FLOW of supplies to all mines must be maintained despite uncertain delivery dates and extreme shortages of materials to assure the war program of adequate coal supplies. This means, however, that careful planning and knowledge of the markets are required. Many operators will be interested in the story of our problems and our unique solution to them.

We operate a small lignite mine in an isolated part of the country. Our equipment is old and supplies are hard to secure and shipment, even in normal times, is slow. Our sources of supply are located anywhere from 600 to 2,000 miles away. There are no distributors near us who keep supplies on hand, and few manufacturers can send parts from stock. They usually must be fabricated to order. We have not a sufficiently good financial position to carry an inventory of any size. So it becomes obvious we have been operating virtually under war conditions for a number of years even before Pearl Harbor.

We were not completely informed about the improvements in mine machinery and the latest operating practices. We had no way of securing this information and did not have any data whatsoever until the last few years when members of our organization began to keep in touch with the American Mining Congress. It has been

necessary for us to devise repair methods and materials out of the supplies on hand rather than depend on new material or tested repair methods. Today operators are generally in much the same position whether large or small. The mine must be kept running. One cannot wait for repairs for days, weeks, or months.

We are now producing nearly 30

percent greater tonnage than our equipment can efficiently handle. This strains all our machinery to the breaking point and, in fact, sometimes considerably beyond it. The equipment is all very old and is of various kinds. Our repair man is a jack of all trades, he must be able to repair steam, diesel, and gasoline driven engines as well as fix wagons, scrapers, and drive horses.

Threshing Machines to the Rescue

About 25 years ago, a super-salesman traveled through our section of the country and sold every farmer a threshing machine. These were 18- to 20-ton steam machines with 11 ft. driving wheels and a 24-in. tread of $\frac{3}{8}$ -in. steel. We have purchased these in almost wholesale quantities at junk prices and they constitute our repair inventory. The boilers are removed, and the flues are cut out. The large wheels are taken off, lugs removed, and the supporting spokes cut away. The wheels are then cut in half and flattened in a press. All fittings are saved. What remains after this type of surgery is shipped as scrap.

One of the boilers has been doing
(Continued on page 40)



Small tipple. Note uses of welding and cutting torches. Also conveyor sprockets

duty as a crusher for nearly eight years with very little maintenance cost. The boiler was cut to size, flues were of course first removed. A 4-in. shaft from a thresher was used as the central shaft in the crusher and the drum attached to this by spiders made from the flattened threshing machine wheels. These spiders were placed about 12 in. apart and the entire construction was extremely rigid and strong. The only new material used was manganese alloy made into teeth and welded to the face of the boiler or the drum.

Pinions from these old threshers are used as conveyor sprockets. These are steel and are much stronger than the usual cast sprockets. Small boilers become drums for the conveyors and the guide bars which are welded on the drums are the old cleats from the thresher wheels.

All of the spokes are saved. These are of various sizes and whenever a round piece of iron is needed they are available and can be cut, or welded together if greater length is needed.

As in most mines we use many conveyors. Pulley wheels are constructed from old boilers by welding in spokes after cutting the boiler to the proper size and re-welding. Scraper conveyors utilize the chain drives from the threshers and the cleats are the lugs from the thresher wheels.

These wheel cleats are versatile. They became supports, angle irons, and in one case were welded together to form the greater part of a 50-ft. boom for a gas dragline. This drag, by the way, was the resultant from two shovels, one diesel engine, and one gas engine, rescued from the Fort Peck Dam. They were torn down and rebuilt into a good gasoline-driven dragline with caterpillar treads, plus an extra diesel motor.

The boilers from the threshers have often been used as auxiliary steam units where needed. If not strong enough to carry pressure, they are dismantled,

cut along the rivets, re-welded to size, and make excellent smokestacks on the shovels. The cost is about one-sixth of a new smokestack and they last much longer. Old boilers also become water storage tanks for shovels or dinkeys. Carbide cans welded together make a very practical chute in connection with a coal blower and deduster system.

We used to buy dinkey tires until recently, but they were expensive and had to be made to order in small quantities in a plant 1,500 miles away. Now we build up the tires by welding and then turn them to size on the lathe. This seems satisfactory and is much quicker and cheaper.

Sometimes when we do not have bearings of the right size we use temporary ones of oak. They work very well for a short time and if necessary to provide for a longer period we sometimes place babbitt in a mold and then set this into the wood. At the present time a wood bearing on a car puller exposed to the weather has been in operation for over two years.

Sub-Zero Weather Brings Its Problems

Sometimes special problems appear. Sometimes we solve them easily and on the spot. But one not so simple seemed to be the problem of steam in the pit. On days when the temperature reaches 45 degrees below zero, as it often will for 10 days to two weeks at a time, the exhaust steam hangs in the pit. It is impossible for the operators to see their own bucket, the men, the dinkeys, or the coal. We struggled for years but with no solution. Colored lights were tried but they didn't help. Finally we contrived a wind machine such as is used in the movies. This consisted of an airplane propeller and a Ford motor. This removed the steam but it also removed the men working in front of it. At 45 degrees below zero it wasn't very

practical. We still have steam in the pit.

The coal which we mine is approximately 15 ft. in thickness, and in order to get a clean cut along the bank side of the pit we used a cutting machine which is very much like an under-cutter only it operates on a vertical plane. This was manufactured at the mine out of an old Buick motor and a cutting chain from a worn-out underground cutting machine. We now find that it operates very well and will give a clean cut to the depth of approximately 10 ft.

We have recently taken an inventory of our repair supplies. We found that we had a great many parts which off-hand would seem entirely useless. We have various odd pieces of metal and barrels of scrap babbitt which we have purchased from a local scrap dealer. Also gears and other pieces of metal which we had purchased at scrap prices. No one can tell by looking at any particular piece when, where, why, or how it will be used. However, within two or three hours it may be a vital operating part of one of our machines.

This story has not been a technical one of methods and types of repairs. I do want to point out, however, that it is not always necessary to purchase new and modern machinery. A mine can be operated, and in most cases, repairs can be made with the material on hand. Sometimes these may be temporary and in most cases they are not nearly as efficient. However, the work keeps going and the job is done for the time being. I do not want you to understand from this that we believe this is a correct way to operate nor do we believe that temporary repairs should be made in place of permanent ones. It is always our desire, as far as possible, to make permanent and lasting repairs of a type which will be most efficient and most economical.

As has been pointed out, we operate a small mine with limited finances. We must do things cheaply and quickly and they are not always done properly or efficiently. We have a high-cost operation, and mining as we do, we cannot help it. I do not suggest that anyone should follow in our footsteps, yet there is one very important point of this story that must not be overlooked—our mine produces coal daily!

That is the purpose of telling this story. We are at war. We must produce guns, ammunition, tanks, planes. Coal is vital. It supplies raw material, power, electricity, transportation. Without coal we fail in maintaining one or more of these.

The mines must be kept running. They may not operate for a few hours or days at the lowest cost and the most efficient point, but they'll get out coal. It's everybody's duty to see that coal is mined each day, every day.



Threshing machine pinions and wheel cleats, iron, and spokes are an important part of this screening plant

Electrical Controls

On Late Model Shovels

An explanation of the Amplidyne, Rototrol and Double Ward Leonard control devices for electric shovels and draglines

By LESTER E. BRISCOE

Electrical Engineer
Ayrshire Patoka Collieries Corporation



IT IS an engineering principle that electrical and mechanical engineers should coordinate their ideas to produce well-balanced electric shovels and draglines. It has been the practice of shovel and electrical manufacturers to recommend standard equipment which has been demonstrated in actual operation over a number of years and has proved to have the required speed, torque, and thermal capacity for any particular type, weight and size of machine. The operation of the electrical equipment in the field frequently dictates changes in size of equipment or electrical adjustments in control.

It is known that the conditions under which shovel equipment must operate are, without doubt, more difficult than other extensive applications of electrical and mechanical equipment. The rapid movement of the dipper on a shovel in uncertain bank material, the rapid acceleration and deceleration of the swing motion subjects the whole machine to severe shock.

The application of Ward-Leonard or variable-voltage control, to electric shovels and draglines has been a remarkable development. This type of control, in a large measure, inherently limits the maximum torques exerted by the motors, and consequently, stresses on mechanical parts.

However, it has come to be recognized that when operating at high speeds, sudden changes in loading, as in plugging or stalling the drive, will produce excess torques, and result in breakage or least increased wear and maintenance of mechanical and electrical parts.

A rather recent step in the design of shovel and dragline electrical equipment, for use with variable voltage control, has been to reduce the magnetic or electrical inertia to obtain faster response for acceleration and deceleration, thereby holding the currents during operation closer to steady-state values. This faster response has been accomplished by several changes, one of which is the use of smaller generators, particularly to the extent of one generator for one motor, where more than one motor is used for the same motion, and the

operation of these units at 1,800 r.p.m. instead of 1,200 r.p.m. The higher speed design of generator has less magnetic structure, hence will respond more quickly. A further step in the design has been the use of low voltage generator fields, that is, a design which gives say 25 percent voltage on the field and 75 percent voltage on the external resistor. Another consideration in obtaining faster response, is the reduction of copper to a minimum on the generator pole piece. It is, of course, necessary to have sufficient excitation to obtain proper no-load voltage; however, on the other hand, it is obviously foolish to load the pole piece with unnecessary copper.

The trend in design of electric shovels and draglines is toward increased production, effected by:

1. Complete and rapid utilization of available power.
2. Greater reliability of equipment.
3. Reduced mechanical and electrical maintenance.

Toward this end there has been introduced a fundamental change in the control for electric shovels and draglines. This consists of the application of control devices which improve the response of the shovel generators and at the same time simplify the control equipment. This has been accomplished by the use of rotating regulators designated by the General Electric Company under the trade name Amplidyne and by the Westinghouse Electric and Manufacturing Company by the name Rototrol and Harnischfeger Corporation Double Ward Leonard.

When the Amplidyne became available, it was immediately recognized that this special, high speed response, high amplification factor machine would fit in perfectly for direct excitation requirements on electric shovel control. Over a period of several years, this type of control had already proven its effectiveness on many different industrial operations. Factory and field tests were made, and a trial equipment was placed in actual shovel service for more than a year. With this background and with definite ad-

vantages recorded, it was evident that Amplidyne shovel control should be offered to the trade.

We speak of the Amplidyne as having a high-speed response and a high amplification factor. These are its distinguishing characteristics which are essential to its use on electric shovel applications.

Amplidyne Control for Shovels

The Amplidyne is, in effect, two d-c generators built as a single machine and operating on a cascade arrangement. It is built as a four-pole machine with four brush studs. Excitation applied to one pair of diametrically opposite poles, causes a voltage to appear between two of the four brush studs. These studs are short circuited and a relatively large armature current flows. The armature reaction produced by this short circuit current acts as a field, causing voltage to appear at the other set of brush studs, where the real output of the machine is taken off. It is apparent that a very small amount of excitation on the first set of fields will produce large armature current at the short circuited brushes which, in turn, will produce relatively large output at the machine terminals. A compensating field on the remaining set of field poles uses the output current in much the same way as the compound field on a conventional d-c generator to give the machine any desired volt-ampere characteristics.

The construction of the Amplidyne is similar to that of any other four-pole d-c generator except that it has been found advantageous to use laminated field structures and distributed windings.

The fast action of this control permits field forcing to any desired extent up to the limit of the rating and capacity of the Amplidyne used. This largely eliminates under shooting on acceleration. In reverse, it greatly reduces overshooting.

At the time this paper was written, a Marion Knee Action 5561 shovel of the Midland Electric Coal Company, Middle Grove, Ill., was the only unit in operation with Amplidyne control. This shovel is equipped with Ampli-

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1. GEARS AND PINIONS

The most important point in replacing gears and pinions is to see that they mesh properly. A gear will usually wear out about five pinions—a new gear installed with a badly worn pinion will usually ruin the gear—they will not mesh properly.

2. WORMS AND WORM WHEELS

These items must also mesh properly when installing—be well lubricated when in operation.

3. SPROCKETS AND CHAINS

When installing a new sprocket—check the pitch of the chain. Do not use a new sprocket with worn chain or a worn sprocket with new chain.

4. ARMATURE COILS

When rewinding an armature—be sure the core is smooth with no burnt places—no sharp frayed edges which might penetrate the coil. Always use a connection diagram.

5. CUTTER CHAINS AND BITS

After every cut—run the machine to throw off dust; lubricate with No. 52 oil while the chain is still hot. Keep bits sharp—replace lost or worn ones. For smooth running—replace any broken lug with one of the same angle.

6. CONTINUOUS STEEL STRIP RESISTORS

Keep the resistor bolted firmly in place—leads clamped tightly in the terminals. The resistor element is insulated from the plate with vitrous china blocks—the plates are insulated from the frame with micanite. Be sure this insulation is always in good condition.

7. LININGS AND BUSHINGS

Keep well lubricated with proper lubricant. Watch excessive wear—worn linings and bushings throw gears and other parts out of mesh or alignment.

8. COMMUTATOR REFILLS

When a commutator is worn down—replace at once. Refills are furnished baked and finished—banded to mount on shell.

Follow Factory Lubrication Recommendations.



dyne on all the motions. The performance record of this shovel to date, shows the advantage of coordinating the operation by use of Amplidyne control on all motions—hoist, swing, and crowd.

At the present time, Amplidyne control is being applied to two more units. One, a new Bucyrus-Erie 1050-B and the other, a Marion 350 rebuilt shovel. Both of these shovels are owned by Folley Brothers, Colstrip, Mont.

Rototrol Control for Shovels

The Rototrol is a small d-c generator having the same construction and theory of operation as any standard direct current generator of equal size, with which any mine electrician is familiar. It functions entirely through the interaction of field windings, without any auxiliary devices other than the master switch and some small resistors for adjustment and control of its field circuits.

Before application to shovels, the Rototrol had been used extensively for upwards of 15 years in a variety of industrial drives. It has time-proven its effectiveness in hundreds of successful installations requiring sensitivity and high speed response, such as elevators, planers, skip hoists and steel and paper mill drives.

As applied to shovel and dragline service, the Rototrol unit is supplied usually with the three main field windings known as:

1. The self energizing field (SE) which supplies the power required to effect regulation. This field winding in some cases is connected in series with the Rototrol armature, and in other cases a shunt connection is used.
2. The pattern field (P) is connected to the 125-volt exciter circuit and controlled by the master switch and resistors. By manipulation of the master switch the direction of excitation and the strength of the pattern field are varied, giving reversal and speed control of the shovel motion.
3. The pilot field (D) is the field that provides automatic regulation. As this field usually is connected to oppose the pattern field it is commonly known as the differential field.

Tests have been made which definitely show that the Rototrol will effect equal improvement in operating characteristics of all motions of a shovel or dragline.

Double Ward Leonard Shovel Control

The Double Ward Leonard Control consists of an exciter and generator power unit supplying power to a d-c shunt wound motor driving the shovel

machinery. The control of the magnitude and direction of power is through the field windings of the exciter which has an extremely quick response to variation of its field excitation.

The principal advantageous features of this control are:

1. Its simplicity.
2. Smooth quick response.
3. Elimination of excessive mechanical and electrical shock.
4. Reduction of electrical and mechanical maintenance.

There are two independent field windings adjacent to the exciter frame. The interpole winding, the field nearest the armature, is extended into the main pole structure. This improves exciter characteristics and permits a wide brush shift, approximately 30 degrees, without detriment to the commutation inherent in this unit.

A small shovel moves much more rapidly than a large machine. Consequently it is normal to expect higher percentage peaks and a more jagged

performance curve. The Double Ward Leonard Control, however, corrects this condition very effectively.

Conclusions

From the facts presented, it is believed the Amplidyne, Rototrol or Double Ward Leonard will accomplish more complete and rapid utilization of available power with greater reliability of equipment and reduced mechanical and electrical maintenance.

To date, Amplidyne and Rototrol have only been applied to large revolving shovels and draglines, and in each installation a very satisfactory performance has been obtained, with promise of reduced maintenance costs. To date, Double Ward Leonard has only been applied to shovels up to five yards. The rotating regulators may be used on all sizes of shovels and draglines.

Editor's Note: Several diagrams will be presented with the paper. They will appear in full in the Coal Mine Modernization Year Book.

Quality Coal For War and Post-War Markets

Much can be learned by the lessons of the last war

By E. R. KEELER

President
Franklin County Coal Corporation

TO APPROACH the problem of quality coal for war and post-war markets I wish to first discuss what happened to coal in World War I. At that time, you will remember, coal was very much in the saddle. In 1918 coal furnished 81.8 percent of the total b.t.u. equivalent contributed by the several mineral fuels and water power in the United States. This gradually was reduced to 48.8 percent in 1940. In 1918 practically the entire competition was inter-coal, and the coal operators' only competitor was coal from other mines. You all remember the result. It almost became general practice to ship sub-standard quality and preparation into the market. The public had no choice in the matter, as they were anxious to get fuel of any kind.

Furthermore, as soon as the war ended and the transportation shortages developed prices went sky-highward, and a slow but sure resentment toward our industry was developing in the minds of many of our customers.

The public was ripe for switches to anything other than coal. The bituminous industry at that time was almost completely "in the dog-house." You also remember well what happened. Gradual switches were made to competing fuels, such as fuel oil, natural gas and hydro-electric power, and so, as the years passed, we entered into a situation when the bituminous coal industry, with a few fortunate exceptions, seemed headed towards bankruptcy. Ninety-five percent of the reason for this dilemma was the fact that the bituminous industry had lost much of its markets. It is markets that give the coal mines running time. It is markets that make contented labor, and there must be markets for profitable operation.

Here we are again in World War II, with new markets again thrust on us, and it seems to me that this presents a great opportunity to retain these markets so that our industry can be a prosperous industry in peacetime as well as war-time. Fortunately

our industry is in a much better position today to meet this opportunity than it was 25 years ago. The technical improvements in preparation have been tremendous. In 1918, 3.8 percent of the bituminous coal was mechanically cleaned at the mines. In 1942 it is estimated that nearly 25 percent was mechanically cleaned. Double-screening and close sizing, almost unknown 25 years ago, are now widely practiced. Dust-proofing and other forms of surface treatment, previously experimental in nature, are now standard practices in many fields. These advances now enable an operator, if he will, to provide his customer with clean, uniform and dust-free coal in sizes best adapted to his specific needs.

Although the industry as a whole is meeting this challenge in a splendid manner, there are signs in the present-day coal picture that suggest some recent retrogression rather than continued improvement. In times of increased demand it is easy to relax former standards of quality and to by-pass a few or many of the steps necessary to produce a coal product that can be competitive with or even superior to other forms of fuel. I have heard coal operators say, "Why treat coal now for dust when people must have coal. Why go to this trouble?" And my answer is, "What good will be all the dust-proofing in the world after the war if nobody wants to buy coal?" Again, it is true that a trifle higher recovery can be obtained by shipping sub-standard coals to the market, but the short-sightedness of such a policy was definitely proved in the last World War.

Perhaps some of us have not realized the full implications to the war effort of permitting the ash content of our prepared products to creep up towards that of our raw coal. If we assume an annual production of 500,000 tons from a mine, the excess of ash of only 1 percent requires one hundred 50-ton cars per year, nearly two a week, for transportation purposes alone. If half of this production were to be used in a blast furnace, the excess 1 percent would result in an annual loss of approximately 15,000 tons of pig iron. Extra ash means decreased capacity in a powerhouse, decreased output in a war industry plant, decreased efficiency in army camps and increasing doubts as to coal's real worth in users' minds. In my opinion, excessive ash and all the other attributes of imperfectly prepared, sub quality coal just is not good business and even could be described as approaching a condition of actual sabotage. Both for satisfactory and rapid culmination of the war effort and for the post-war retention of our present markets, quality of coal must be maintained and improved.

Coal preparation actually begins at the face, although this fundamental

precept is frequently overlooked. It is at the face that the dominant sizes of coal which will be put through the preparation plant are determined, and it is at the face that a substantial portion of the mechanical cleaning problem is effected. In the cleaning plant maximum attention must be given to strike a balance between high quality and excessive reject loss. Extraneous impurities must be removed. High ash portions of the coal must be removed to the point where additional removal introduces serious difficulties in the cleaning process or adds excessive costs in the form of rejected heat units inextricably combined with the high ash ingredients.

Fullest attention must also be given to the attaining of uniformity. It is commonly stated by large consumers of coal that uniformity of coal with a moderately high ash content is preferable to coal containing lesser amounts of ash, but varying widely in character from day to day. Rigid control of each size put through the plant, both as to size and ash content, is of the utmost importance.

No one can know with certainty the developments in the utilization of coal which will come after the war, but we do know that changes will take place. Among many other interesting developments is the smokeless stove being developed at the Battelle Institute. It is probable—even certain—that most of these developments will re-



quire high quality coal and high standards of preparation.

Opportunities for the future of coal are, in spite of our own sales departments, bobbing up everywhere. The restriction of fuel oil has caused thousands of conversions to bituminous coal. I do not mind saying it is going to be the policy of our company (to which I hope that all operators will agree) to continuously furnish these new customers clean, well-prepared coal, so that they will gladly continue to use coal when the war is over. It is only by the retention of a large portion of these additional markets that the coal mines of this country in the post-war period can operate more nearly to capacity, which they must do to make our industry a profitable one.

Conservation of Material

"We don't wear many things out in the coal industry. We just tear them up."

By JOSEPH PURSGLOVE, Jr.

President
Cornell Coke Company

ABOUT 60 PERCENT of our coal-mine machinery and electrical replacement parts are required because of breakages due to ignorance, carelessness or neglect, or all three. The other 40 percent is owing to the actual wearing out of the parts. So we could make the greatest contribution toward conservation of material if we might somehow eliminate these three offenders: ignorance, carelessness and neglect.

With so many of our skilled men going into the armed services and other industries creating a shortage of trained labor it appears difficult to institute educational programs for our employees. Nevertheless, because of these very facts we need educational

programs more than ever before for the new men we are employing. Some contend it is impossible even to continue educational programs started years ago. I cannot go along with this negative attitude. I know of a good number of coal companies that have greatly expanded their educational programs since Pearl Harbor, and some that have launched entirely new programs since. These companies report that although it is more difficult to run classes today than it was four years ago the results are even more outstandingly successful on a comparative basis.

It is quite feasible for the larger coal companies to set up educational programs of their own, using per-

sonnel that they might already have in their employ, or by employing the necessary personnel to handle it. The smaller companies cannot support a training staff, perhaps, by themselves, but they can join with several other companies in their vicinity and operate such a plan jointly. In fact, the larger companies in their neighborhoods would, without doubt, be willing to have the smaller companies participate in their program on a pro rata basis. We are beginning to learn in the coal industry, at long last, that not one company, large or small, can hope to monopolize all the talent.

When the parts are broken or are, more rarely, worn out our ingenuity is challenged as to how to best repair them instead of using new parts. Electric welding is probably the best conservator of material on any coal property. Thanks to the many welding schools around the country we have been able to secure good welders for the industry, and most companies have several men who can do satisfactory jobs.

The metallizing process has come into use at a large number of coal-mining shops. It is primarily a program for recovering and conserving material, so no paper on the subject could pass it by without mentioning its general uses.

There is a great deal of used, worn shafting, particularly around the smaller mines, that is sent direct to the junk yard. This could be recovered if cleared through some large machine shop repairing mining machinery. Well-equipped and well-managed coal mine shops are recovering many thousands of pounds of metal each year and utilizing them to

good advantage making various repair parts such as shaftings for loading machines.

The conservation and repairing of rubber-covered cable for our locomotives, cutting machines, loading machines and drills presents one of the most perplexing problems at the coal mines. Here again, if we could just stop cutting up our cables carelessly the problem would be two-thirds solved.

New copper wire is hard to get, but there is a quantity of used 2-0 and 4-0 copper wire left on the market, and the mines should use all of it before buying new wire. It is possible to weld short pieces together to make a good strong continuous wire, and we could thus save thousands of feet each year.

Steel rails can be saved by the obvious method of each mine superintendent making a drive to see that all the rails are removed from abandoned sections. There are thousands of tons of rail lost each year in our mines, and we cannot afford this loss of steel today.

Another practice that should be discontinued for the duration; that of cutting up good rails for mine roof supports. Wood timber should be used in all cases if at all possible. It is often possible to find suitable steel beams in the junk yards.

Angle bars and bonds can also be saved by welding the joints. However, my experience with brazed bronze joints and electrically welded joints without angle bars has not been good. They appear to be wonderful for about a year, then they begin to fail in points where the track runs through soft-bottom areas. These

joints would probably last for years if the mine track had been well ballasted and drained, but too few mines have ballasted main line track.

Some of us have thought that mine timber and lumber would always be plentiful and free from priority difficulties. Many of us who have seen our post and cross-bar piles dry up, and have tried frantically to get more to keep the mines going, now realize that it won't be long before all mine timber will have to come under priority control or we won't be able to run the mines very much longer. We must conserve our timber and lumber along with our metals and rubber. Properly built post pullers are becoming more common in mines. It requires a sizeable piece of equipment to recover posts and cross-bars safely, and it cannot be done very well with these small hand-operated pullers on the market. In mechanical mines we have too much timber to recover in too short a time to use these hand pullers to much advantage.

Creosoted timbers that will probably outlast steel in a mine are still available I am told, and every mine that requires permanent timber jobs along main roads should keep a supply on hand. There is a fire hazard involved in putting creosoted timbers over or adjacent to trolley wires. Timbers treated with zinc chloride are available and should be used in such places.

Every day a new directive comes from the Government to increase coal production to new heights and records. In the same mail we receive warnings about less material and less men with which to produce. It is a challenge that only industry-wide co-operation can meet.

Removing Seam Impurities Underground

LAYMEN GENERALLY believe that people in the mining industry merely put a hole in the ground, add a few pieces of equipment and then sit back and clip coupons. It is extremely difficult for any except the operating departments and those closely associated with mining to visualize the time and effort given to investigating, planning and financing for essentials such as organization, ventilation, transportation, drainage, mechanization, preparation and selective mining.

The rapid exhaustion of high quality and the more easily mined seams of coal have made it necessary to produce a great portion of our yearly output from the thin veins and from

those that contain more impurities and have inferior physical conditions. This trend is becoming more acute each year, therefore, the industry must get the most out of specialized methods to suit the vein that is being worked. This means "remove the impurities underground" and, if necessary, load the parts of the seam separately, provided, by so doing, a qual-

ity coal can be produced that will serve an important market. This is what selective mining means, and those who practice it are in an enviable position in new important markets.

Please bear in mind each mine and even different mines in the same seam present different preparation problems and must be approached from different angles. Such important phases as

"The Coal Industry must prepare now to play its part for the streamlined era which will follow at the end of the war"

By **JOHN J. SNURE**

Assistant Production Manager
Rochester and Pittsburgh Coal Co.

type of markets; total seam analysis; analysis of all individual parts of the seam; structure of coal and impurities; characteristics of coal and impurities to be stored inside, and the specific gravity of each part of the seam from main top to main bottom. It must also be remembered that the plan for selective mining must synchronize with the outside cleaning plant so as to give maximum results.

Safety

In the methods explained in the following paragraphs precautions are always taken to neutralize the dust from the coal and impurities stored inside the mines. Extensive dust allaying systems are being installed as rapidly as proper equipment can be obtained. Sprays are being placed on all loading and cutting equipment and where tests show it is necessary they are installed at transfer and loading points. Water, with Compound M if necessary, at proper pressures is used in all sprays. Samples are gathered regularly and analyses made so that the dust count will be kept below 50 million particles per cubic foot.

Mechanization

The increased cost and change in mining methods brought about by selective mining have made it necessary to turn to different types of mechanical and conveyor loading. By these changes seams that were formerly considered unmarketable and too high in cost can now be mined economically and prepared in such a way as to always be saleable.

The bulk of the coal produced by the mines briefly described herewith normally went to the low grade steam markets. As the demand for this type of steam coal decreased it could readily be seen that better markets must be found for these operations, or production be curtailed, or finally the mines would possibly go out of business. Therefore, in the past several years, the special methods have been established depending on the characteristics of the seam.

Our Mine No. 1 is operated in the Double Freeport seam and has an overall height from roof to bottom of 72 to 80 in. From top to bottom it is as follows: 2½ in. of cannel bone, 18 to 20 in. of top coal high in ash and sulphur, 10 in. of boney, 42 in. of coal, 1½ in. slate binder and 6 in. of bottom coal high in impurities.

In order to produce a marketable product at competitive costs, a special method was planned and operated successfully by successive steps of cutting, blasting and removing the marketable grades of coal. Generally the quality of the coal produced by this system is more satisfactory than that produced previously by hand-loading.

"Mine 2"

Mine No. 2 is operated in the Double Freeport and has practically the same cross-section at Mine No. 1, but the difference in the analysis of the top coal makes it necessary to work out a different system of selective mining. The cross-section of No. 2 Mine is as follows: From top to bottom we find 2½ in. cannel bone, 18 to 20 in. coal, 10 in. boney, 42 in. good coal, 1½ in. slate binder and 6 in. of unmarketable bottom coal. Different systems are used in the production and development sections.

In the production sections one-half of the center-bone and all the top bench are left up and make a good roof. Four inches of bone, and 2 in. of the bottom bench are cut out by a Caterpillar Mounted Top Cutting Arcwall Machine, which makes a cut 26 ft. wide and 8 ft. deep. The kerf is then cleaned and the face of the cut and adjacent bottom swept and the dirt thrown in the gob. When cross-cuts are turned, the dirty cuttings are loaded into shuttle cars and transported to worked out areas. The coal is then drilled directly above the bottom binder with portable electric drills and then shot with permissible powder. (Self-propelled rubber tired drills have been purchased and will replace hand-held drills as soon as delivered.) The coal is then loaded into 3½-ton storage battery powered shuttle cars by a tractor-mounted mobile loading machine. The shuttle cars transport the coal to elevators that load the coal into 10-ton mine cars.

No attempt is made to recover the high ash and sulphur top coal on production work at present, but a modern cleaning plant is planned and then it is probable that at least part of the top can be blended with the bottom and still maintain a good product.

In the development sections the top coal is mined and as much as can be used is sent to the central power house for fuel. What is left is cleaned and blended carefully at the face with the bottom coal.

"Mine 3"

Mine No. 3 is located in the upper Freeport and has a cross-section as follows: 5 to 14 in. of blackjack on top, 34 in. of coal, 1½ in. binder, and 3½ in. bottom coal. In this seam there are several major problems; first, the 34 in. of by-product coal must be loaded separately; second, the bottom coal is saleable on the steam market and since height is a big factor, it is advantageous to load the bottom coal out in a separate cycle; third, the synchronizing of the two loading cycles as there are from five (5) to eight (8) conveyor crews loading on one mother belt; and, fourth, the handling of the dirty cuttings and the blackjack that may fall.



"Mine 4"

Mine No. 4 is operated in the Eagle Seam and produces metallurgical coal, therefore, the resultant must be clean and regular in analysis. A cross-section of the seam in this mine shows: Main top to bottom, 8 in. draw slate, 11 in. boney and 41 in. of clean coal.

Hand loading was prohibitive in this mine because of irregular and high analyses; high cost due to low recovery brought about by the slowness of hand loading under an extremely heavy overburden, and the handling of 20 in. of refuse by hand. A special method for producing and cleaning this coal has been planned and carried out successfully.

The system of selective mining employed at this mine, as shown by actual average analysis on 100 railroad cars, reduced the ash from ¾ to 1½ percent over hand loading and, in addition, is producing at an economical cost and is making it possible to control the roof by rapid extraction.

Conclusions

Selective mining methods have placed those and many other mines into a preferable market, however, it always is well to remember that each operation is a different problem and necessitates exhaustive study of market requirements, impurities and their location in the seam, storing impurities inside, structure of coal and impurities and specific gravity. I would like to leave this thought with men in the coal industry. The era that will follow the war period will certainly be streamlined beyond our imagination and those in the coal industry that are not ready to adapt themselves to this progress must fall by the wayside. The best of our coal seams will have been greatly exhausted, making it necessary to mine inferior quality, low veins, and seams having bad physical conditions. Therefore, it will take greater effort, more efficient planning, and better execution than has ever existed before in this great industry, but it is not an impossible job.

Safety In Wartime Mining

It is more difficult to find answers to some of the older peacetime safety problems which are now more acute

By E. R. PRICE

General Superintendent
Coal Properties, Inland Steel Company

THE COAL INDUSTRY has adapted itself to a greatly accelerated production program in face of a heavy loss of men to the armed forces and defense industries. This performance in the face of these handicaps reflects great credit on the management of the mines. Unfortunately the increase in production has taken more than the customary toll of personal injuries, and a vital problem confronting coal mine management is the maintenance of safety under wartime conditions.

In these times of stress we must protect the men who are engaged in our essential industry, not only for humane reasons, but because we know each man is needed to maintain the production of coal for war. We must approach the solution of these problems on the basis that a workman injured in any of our mines as on the field of battle is a war casualty.

The National Safety Council recently issued a report showing that accidental deaths in most of the nation's principal industrial States during the first quarter of this year totaled 2,037, an increase of 8 per cent over the same period of 1942. The Council said reports received from 21 State industrial commissions showed 739 accidental deaths in March of this year, an increase of 14 percent over March, 1942.

The U. S. Bureau of Mines reports 1,415 fatalities during 1942, and it is expected final reports will bring this figure to 1,482, an increase of 217, or 17 percent over the 1941 figures. Coal production increased 12½ percent in 1942 over the previous year, but the death rate was 2.33 per one million tons as compared with 2.24 for 1941.

A comparison of the principal causes of fatal accidents during the year 1942 with those of 1941 indicates an improvement in all causes except haulage, gas or dust explosions and surface accidents. The U. S. Bureau of Mines, from incomplete data, reports 80.85 injuries per million man hours in 1942 against 77.29 injuries per million man hours in 1941.

I have contacted a number of the larger operating companies in the Appalachian area, both North and South, and without exception they report in-

creases in both severity and frequency accident rates in 1942 over 1941, and this year to date their accident experience is less favorable than for the same period in 1942.

Dr. R. R. Sayers, Director of the U. S. Bureau of Mines, in a recent article in *Coal Age* estimates accidental deaths and injuries in coal mining cause this country a potential loss of approximately 11 million tons of coal annually; that accidental deaths and permanent total disabilities remove over 1,400 coal miners from production each year and approximately 60,000 other lost time accidents cause a yearly loss of about 2,200,000 working days. The loss of manpower from accidents mentioned by Dr. Sayers is a challenge to the industry, and we know there never has been greater necessity for intensive accident prevention than at the present time.

Stress of War Magnifies the Absentee Problem

The Mine Workers, in their proposals to the recent Appalachian Joint Conference (North and South), state the operation of three shifts in 24 hours and concentrated methods of mining have increased the hazards of coal mining and have been the cause of great loss of life. They demanded, in the interest of safety, that a provision be set in the base agreement that the number of shifts be limited to two within any 24-hour period.

I have no special defense for triple shifting because my experience has shown a loss of efficiency on the third shift, but there is no reason why rock dusting cannot be carried on and proper ventilation maintained on the third as well as on the other shifts. If the proper safety precautions are taken, there should be no increase in accident experience due to that schedule of operation.

The records available to the United States Bureau of Mines do not carry sufficient information to enable it to determine if a greater number of accidents or explosions occur at mines where triple shifting is practiced. The operators therefore rejected the Mine

Workers' proposal which undoubtedly would have resulted in a loss of tonnage at a time when maximum production is required.

We must, however, recognize in mechanical mines where double and triple shift schedules have been adopted that necessary precautionary measures must be taken to counteract any increased production of methane and coal dust.

We are now experiencing the greatest labor turnover we have ever known, and we have always assumed that new employees are a great potential hazard. The loss of men has been felt in all departments, and as a consequence we have had to replace production employees such as miners, motormen, brakemen, etc.; electricians and other skilled men; foremen, as well as office and store employees with less experienced men.

The adoption of the six-day work week, with time and a half pay, has resulted in a substantial increase in the earning power of the men. This additional "take home" money often results in more absenteeism. The reports I receive from other operators, with one exception, correspond with our experience at Wheelwright, which shows a gradual increase in absenteeism. I do not know why the stress of war would magnify our absentee problem, as it seems the men would recognize that it is their patriotic duty to work more regularly during this critical period. Certainly absenteeism has a direct bearing on accidents when men holding key positions have to be replaced by men who are not familiar with the work.

We must recognize that many of our men are worried about the war. They have sons or brothers in the armed forces, and it is difficult for them, under these conditions, to keep their minds focused upon their work. Tragedy to himself or his fellow workmen frequently occurs because of inattention to the job at hand.

The industry should give more thought to the training of the inexperienced men it employs, and that can be accomplished with but little increase in personnel. It is not necessary for us to permit the demands for increased tonnage to lead us into speed-up methods, the effects of which will be to disregard known standard safety practices.

The safe operation of a mine is the responsibility of management. Mines with good safety records have always been managed by men who took an active personal interest in safety at all times. That kind of interest on the part of top management transmitted through the foremen, who are in direct charge of the work at the face, is reflected in the attitude of the men. Foremen, by example and leadership, can make good safety records regardless of conditions.

There is also a tendency on the part of the supervisory men to become more lax in their inspections and in the enforcement of safety rules. Management must not allow the development of such an attitude. The recent proposal of the United Mine Workers to organize all supervisory men below the superintendent is certainly not conducive to the safe operation of the mine, and I do not want to believe such an intolerable condition will ever exist in the coal industry.

At our Wheelwright Mine we have not relaxed in any degree in carrying out our safety program. In fact, we have intensified all safety work because of the conditions that have been created by the war.

We have installed public address equipment in the main office with loud speakers located at the entrance to the mine and at the man station about one thousand feet in by the mine opening on the empty track. Safety messages are frequently broadcast by our safety engineer to the men before they take the man trips to their

working places. This equipment we have also found helpful in enabling us to get any information to all of the men quickly about any other phase of operation such as preparation and absenteeism. In addition, we have talked to the men about the purchase of War Bonds.

Our program also calls for the holding of monthly safety meetings by each section foreman with his own men underground.

For several years we have been conducting a class in vocational training for the benefit of the mine workers who aspire to supervisory positions. To date 87 men from our operation have qualified for either first or second-class State Mine Foreman certificates.

In my opinion, this is no time to relax in our efforts to reduce accidents, and at our operation we intend not only to carry forward our present program without any let-up but to enlarge upon it when we learn of something that we feel will be helpful in preventing accidents.



millions of particles per cubic foot, while the other face operations may vary from 50 millions to 200 millions. These figures are not specific in any case, and extremes on either side may be found under certain conditions, but are cited to show the need of allaying dust at the working face.

The practice of using rock dust in a coal mine is still needed, as much as ever, and the use of water at the faces and along haulageways is certainly desirable, but it has been found that this combination is not always effective.

In recent years the addition of chemicals, either dry or in water solutions, has come into use in an effort to increase the effectiveness of water or decrease the amount used. Calcium chloride has been used both dry and in solution in an effort to keep the treated area moist by extracting water from the mine air. Some tests have been made on sodium chloride in the same manner but the result in these cases have not been entirely satisfactory.

The most recent development in the use of chemicals is the wetting agent. Wetting agents have their effectiveness in their ability to reduce the surface tension of the solution and consequently the interfacial tension between the solution and the small particles of coal dust. These agents enable the solution to wet and trap smaller particles of coal faster, causing them to fall to the floor before they are dispersed in the air.

There are several wetting agents marketed in this country that are applicable in the control of coal dust. Some have been effective under practically all conditions met in coal mines, while others have failed to meet certain essential requirements.

It is realized that the use of wetting agents is a comparatively new method of controlling coal dust, and it is not thought that the peak of development of materials or use has been reached, but under the proper conditions they have been very effective. Under favorable conditions the use of wetting agents have reduced the amount of water used more than 50 percent and reduced the dust count more than 60 percent in comparative tests. In the same tests the operation produced

Control of Dust Underground

Progress is steadily being made in combating the dust hazard in coal mining

By **RODNEY H. HONAKER**

*Safety Director
Guyan Eagle Coal Co.*

THE CONTROL of dust in bituminous coal mines is one of the most pressing problems that face coal operators today. When coal was mined without the use of time-saving machinery many people recognized the necessity of dust control and numerous experiments were made to prevent the formation and dissemination of coal dust. It is now generally conceded that dust can be controlled and that the cost of such control will, in most cases, be more than offset by increased efficiency, safety and happier relations between coal miners and operators.

The U. S. Bureau of Mines recommends that coal dust concentration be kept down to a maximum of 20 million particles per cubic foot of air, for it is believed that such a dust count will not be exploded or cause any appreciable harmful effects on breathing. The determination of such dust concentrations should not be left to guess work or the visual judgment, for a large proportion of the particles are not visible to the eye. While there

have been several instruments developed for the counting of dust particles which may give a close approximation, the most accurate is the midget impinger dust collecting machine and microscopic counting equipment which is used by the Bureau of Mines.

It has been stated by many investigators that over 95 percent of coal dust is produced in operations at the coal face. This figure will certainly be conservative if we include all the operations that occur until the coal is placed in the mine car. The face operations where dust control should be applied are: cutting, drilling, blasting and loading. If the dust is effectively controlled at these points, the other dust producing areas are comparatively easy to control.

Dust counts have shown that cutting produces the most dust, with the amount varying greatly from the higher counts produced by shearing and top cutting machines to the comparatively low amounts produced by shortwall machines. These figures may vary from 200 millions to 600

more than six times as much dust when performed dry as when performed with a solution sprayed on the coal.

The spraying of coal has brought forth many problems that are peculiar to individual mines and which have been solved in various ways. In some mines the unit tank system has been used while in others it has been more practical to use mine water from pipe systems while trailing tank cars have been added to portable machinery in other cases. It is thought that the choice of the source of water and its distribution must be governed by the supply and needs of each mine.

In applying liquids the most effective method has been by sprays. These are of several types: flat, cone, and modifications of the two, which may deliver different sizes of water particles at varying angles from the orifice. It is necessary that strainers or filters be used in the water lines in

order that the spray nozzles not be clogged. There are some nozzles and strainers that act automatically to clean out foreign matter by using bypass valves when the pressure is built up against the screen. Others have manually operated valves that work satisfactorily. The fouling of nozzles and strainers has caused the failure of many spray systems and it has been found that some method of removing small objects at various places in the water system is necessary.

It has been found practical to wet down the face of coal before drilling or shooting. Wetting the dust formed by drilling may be done while the operation is carried on. In mechanical loading where there has been a speed-up in all the work done, there has developed some very faulty blasting. In their misdirected haste drill men have often incorrectly drilled holes and then, after fouling a cut of coal, placed enough explosive in a hole to be sure

of not undershooting again. This excessive use of explosives has resulted in too much dust at the time of blasting and too much fine coal near the discharged shot.

If the coal is loaded by conveyors, sprinklers have been spaced along the pan lines in some instances, while others have found this step not necessary. It has been found that the coal should be sprayed at discharge points unless a shield is placed over the point of discharge, or unless the coal has been thoroughly wetted at the face.

If the coal is loaded into shuttle cars it has been found necessary to have a clean-up crew shovel up all loose coal after each shift and then wet down and rock dust the surface. In some cases the use of calcium chloride in conjunction with a wetting agent has been very effective in allaying dust and helping to form a smooth roadway.

Stripping With Three- to Nine-Yard Drag Lines

A discussion of the use of draglines in coal stripping where the dragline operates alone, removing all of the overburden

By HARRISON EITELJORG

General Manager
Morgan Coal Co.

THE THREE cubic yard dragline is the overlapping size between the largest crawler mounted, clutch type dragline and the small walking type dragline. Draglines smaller than three-yard capacity are not economical for stripping. Beyond the three-yard capacity, all draglines are of the walking type, except a few specially designed large machines that travel on the coal in the same manner as the large stripping shovels. The advantage of walking draglines is their light bearing pressure. The bearing pressure per square inch of even the largest walking dragline is less than the bearing pressure of most small crawler type machines.

It is possible that our company is prejudiced in favor of the dragline for stripping, in view of the fact that we have used and are using draglines exclusively for stripping at all of our mines. We have never been able to

convince ourselves that small stripping shovels could handle an entire stripping operation as efficiently as a dragline. However, there is no doubt but that large stripping shovels can handle tough overburden and can handle the yardage at a much lower cost than any other method of stripping up to the present time.

The advantages of draglines for coal stripping are becoming more and more recognized each year. These advantages are summarized as follows:

(a) *The reach and transporting ability of the dragline permits it to handle heavier overburden and to take wide cuts when desirable. While not quite as fast as the small stripping shovel the same machine as a dragline will actually carry 50 percent more dirt in each bucketful.*

(b) *Operating on the highwall or bench it does not interfere with the loading and hauling facilities in the*

pit and allows more elbow room and freedom of action in the pit, thus it is also able to dig a high percentage of the total available time.

(c) *It does not have to dig itself down to the coal as does the shovel, and where several disconnected pits are involved in the same operation it can move quickly from one pit to the other. The ability to keep several pits open is a very great advantage.*

(d) *Its mobility permits it to be used for the considerable amount of development work that is necessary in the average coal stripping project; building ramps into the pit, building haulage roads, digging drainage ditches, building levees, and many other uses, including the ability to reach and clean up slides.*

(e) *And last, but not least, it is difficult and sometimes impossible to open a box cut with a small stripping shovel, or a large shovel for that matter; whereas, the dragline has the reach to spoil the dirt.*

The three-yard crawler mounted, clutch type draglines, powered with internal combustion engines are used extensively on small acreages of coal where the overburden is not too heavy and not too hard. This type dragline is fast and will handle a lot of yardage in good digging material. Its travel speed is particularly adapted to small operations requiring an unusual amount of development work, or where a lot of travelling is required. In addition it can be loaded on cars without dismantling and shipped easily and inexpensively from one job to another, and can be dead-headed over most country roads.

In the past few years a number of improvements have been made in the

design of the walking dragline primarily to increase the speed of operation and load capacity. The modern diesel powered walker is now equipped with electric swinging units that receive their power from a swing generator driven by the diesel engine or on some machines by a separate diesel engine. We have felt that in this type and size of equipment diesel power was more satisfactory, more economical, and certainly more flexible than electricity. However, electric power is normally the most satisfactory for large draglines and stripping shovels.

Don't overlook the fact that the real digging ability of the dragline is in the bucket itself. The design of the dragline bucket is most important and must of necessity vary with the type of overburden it must handle. In medium hard shale, for example, we prefer a narrow bucket with four teeth—sharp of course—and a thin cutting edge on the lip due to the fact that it digs easier and faster and minimizes the drag pull—whereas, in rock or material that breaks up in large pieces we prefer a wide bucket. The reason for this is obvious.

In experimenting with dragline buckets of every size, shape and design we learned that by reducing the pitch or suck on the teeth the buckets performed better. Dragline buckets were originally built for levee and drainage work where the bucket was working up close to the surface and it was necessary that the teeth have considerable pitch or "suck" to force

the bucket to dig down into the dirt. This type bucket we found was very unsatisfactory in the strip pits—and in hard digging we were constantly breaking teeth and points. We now have all our dragline buckets made with the teeth absolutely parallel with the bottom of the bucket. The only suck is in the slope of the top side of the tooth coming down to the point.

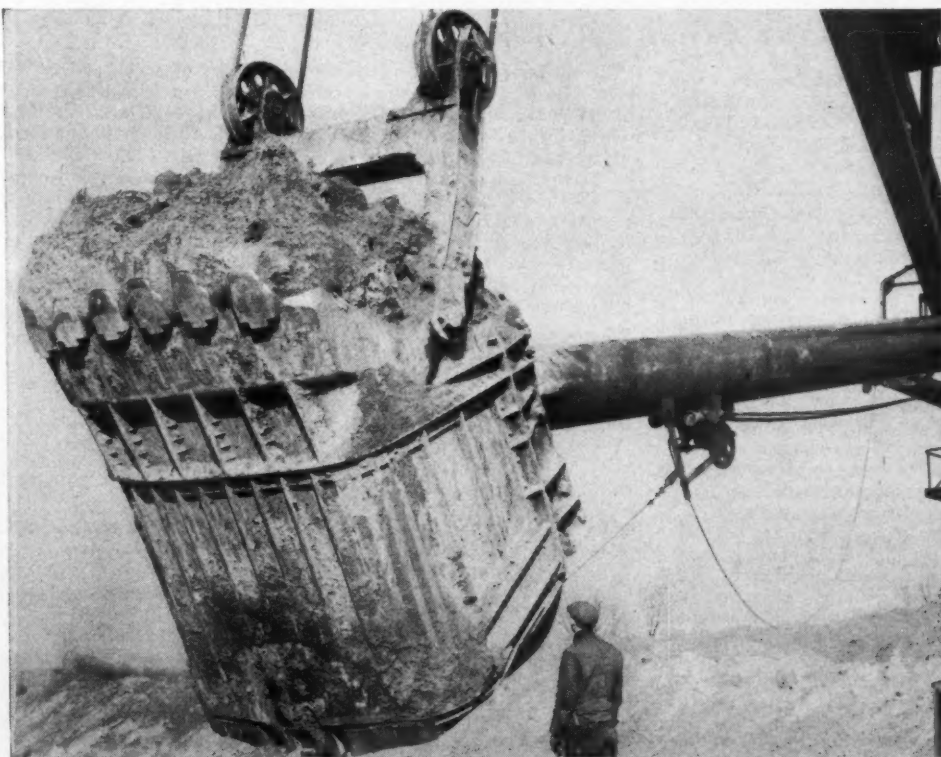
The bucket with straight teeth will also do a better job of cleaning off the coal. In fact with a little hand shovel assistance from the oiler or pit man it will do a better job of cleaning the coal than can be done with a bulldozer. The weight of the dragline bucket is also an important consideration because the load capacity of the dragline is the weight of the empty bucket plus the pay load. It is good judgment to use as light a dragline bucket as practicable thus increasing the pay load it will carry—even though the bucket has to be rebuilt or replaced a little more often. If you increase your bucket capacity one-half yard times—60 cycles per hour, that equals 30 yards per hour, 720 yards per 24-hour day or an extra 75 to 100 tons of coal per day uncovered.

If you are fortunate enough to be able to open up the box cut in shallow overburden—all's well and good. If the box cut is in the heavy overburden, you must utilize all the reach possible in your dragline. In fact, if purchasing a new dragline for the job



it is often wise to order and use a longer boom and smaller bucket on the box cut and later remove a section from the boom and increase the bucket capacity. Throughout Eastern Ohio, Western Pennsylvania and the Panhandle of West Virginia—you'll find many more small shovels than draglines stripping coal. Most pits in this territory are hillside pits with the overburden starting at nothing, or near nothing, and with a downhill throw for the dirt—thus the box cut is practically eliminated and one of the most difficult tasks for the small shovel is thereby eliminated. Even for this type of stripping, however, we prefer and are using crawler type draglines.

Editor's Note: Several sketches to illustrate a few typical dragline stripping problems will be presented with this paper. They will appear in full in the Coal Mine Modernization Year Book.





Snyder shaft headframe, and surface buildings at Bristol Silver Mines Co.

BRISTOL SILVER MINES CO. Producer of Base Metals

HIGH ON the western side of the Bristol Range, about 16 miles from Pioche, Nev., is the site of operations of the Bristol Silver Mines Co. Production of various grades of oxidized ores containing copper, lead, zinc and silver has increased during the last six months from about 45 tons a day to 75 tons. During recent years the geology in this district has been carefully surveyed by the staff of Combined Metals Reduction Company, and indications point to strong mineralization between the Combined Metals Castleton shaft and the development in the Bristol Silver Mines area about 25 miles to the northwest.

At Bristol several veins exist, but the ones accounting for the bulk of the production to date are the May Day, Tempest, Gypsy-National and the Lead-Zinc. These veins contain ore believed to have been formed during different epics of mineralization, but the evidence available in 1926* was not absolutely conclusive, for the ores are all thoroughly oxidized, and there was bound to have been some rearrangement of the copper, zinc and iron during the time the primary (sulphide) ore was being oxidized. This distribution is most plainly shown by the tendency of the copper to occur in the form of chrysocolla and copper pitch in the footwall portions of the ore body. The general limestone environment of the ore bodies would prevent, however, any long-distance migration of the metals during oxidation.

* Geology and Ore Deposits of the Pioche district, Nevada, Professional Paper 171.

Veins in brecciated limestone on the north end of the Pioche area, unlike the consistent limestone replacement ore bodies found elsewhere in that district, are supplying war metals in growing volume

By HENRY S. COLEMAN

Superintendent

The major ore bodies occur along fractured zones in the brecciated areas and in intersecting fissures. The main fissuring system runs east and west and is known as the May Day. The Tempest striking north 80 deg. east (the same as the May Day) dips 70 deg., whereas the May Day dips only 45 deg. The Gypsy-National

series of veins strikes northeast and southwest and dips from 70 to 80 deg. to the east, and the Lead-Zinc vein strikes northwest and dips almost vertically. These two latter series of veins intersect the Tempest and May Day fissure and in these intersections are found the large brecciated zones in which the oxidized ore is found.



George Ahern, chief clerk on left, and Henry S. Coleman, superintendent, Bristol Silver Mines, Inc.

Sulphide ore occurs in very small amounts. In some instances—a soft so-called nodule—the core of galena is covered with cerussite, then carbonate and the mass wrapped in a film of oxidized copper. The ore bodies at the Bristol vary in size and shape, therefore, the amount of ore that each stope will produce cannot easily be estimated.

The main operating shaft is the Snyder incline, sloping 69 deg. to the south. The shaft is about 1,750 ft. deep. Recent underground development has disclosed that the ore in some instances does extend into the limestone bed but not beyond 30 to 40 ft., however. On the west side the average content of the ore is 12 oz. silver, 1.6 percent lead, 4.5 percent copper and very little zinc—around 1 percent or less. In the eastern section of the mine the ore carries 8 oz. of silver, 6 percent lead, 1.5 percent copper and between 8 and 9 percent zinc.

A double-drum Nordberg hoist, electrically driven, is used for hoisting, but operation of only one drum is necessary as the shaft has but one hoisting compartment. A Sullivan angle compound compressor supplies air for drilling.

The mining method employed depends more or less upon the conditions encountered underground. The usual practice is to drive a raise at an angle of 45 deg. into the ore body to the top of the high roof and then mine downward from the roof breaking ore into the so-called glory hole made up into the ore. Although most of the stopes are large very little timbering is necessary. Some stopes as large as 75 by 150 ft. and 100 ft. high have been opened. The ore being soft makes drilling easy. Steel of $\frac{3}{4}$ in. hexagonal is commonly used. In some



Sawing mine rails to length with a home-made air operated saw at the Bristol mine

instances the ore is augered similar to that in coal mining. Powder used is 30 percent gelatin blasted by cap and fuse. Sullivan, Gardner-Denver and Ingersoll Rand stopers and Jackhammers are used.

Where stoping conditions permit small slusher hoists are used. At the present time, two Sullivan slusher hoists are now in operation, one S-211-3 HP air hoist and one S-113. On the larger hoist $\frac{7}{16}$ in. cable is used and $\frac{3}{16}$ in. for the smaller. The S-211 slusher will pull 125 ft. with a small scraper patterned after the Park-Utah hoe type with manganese steel teeth. The other type of scraper has a half bottom, designed to carry the load rather than to dig. Dominic Belingherd is mine foreman.

Ore from the stopes fall by gravity into chutes where cars are loaded and hand trammed to the shaft's pocket and dumped into a two-ton steel bucket. Mine cars are of 18 cu. ft. capacity. Very little water is encountered in mining operations as all work is done above the water table, the top of which is 1,734 ft. below the collar of the shaft. This point is 7,300 ft.

above the sea level. The only pumping operations maintained are those necessary for providing water for domestic use in the camp. Between 40 and 50 men are employed in the mine.

The ore is hoisted to an ore pocket near the surface and trammed a short distance to a surface bin having a capacity of 100 tons. The tramway bin has a capacity of 200 tons. The ore being soft, no crushing is necessary before loading into the tramway buckets. Ore is hauled over the aerial tram a distance of about 9,000 ft. to the ore bins at Jack Rabbit. The load cable of the tramway is $1\frac{1}{4}$ in. and the travelling cable is $\frac{5}{8}$ in. American Steel and Wire. The return cable is 1 in. in diameter. Buckets have a capacity of about 700 lbs., with 35 to 37 buckets on the operating line. The highest point of the tramway is approximately 9,000 ft. above sea level. At Jack Rabbit the ore is loaded into cars of a narrow gauge railroad owned and operated by the company and brought to Pioche and transferred to gondolas and hauled to the International Smelter at Tooele, Utah.

A modern change room, containing showers and 50 baskets for drying clothes, is located near the hoist house. In determining an inexpensive method for heating the water for the shower baths, the hot-air pipeline from the compressor to the air receiver and the warm water from the compressor were utilized. This was done by surrounding the hot-air line with a tank which contained the warm water from the compressor, thereby heating it to a higher temperature. This has worked very satisfactorily, and we are thus using waste heat to advantage. There is a disadvantage, however, in not having hot water unless the compressor is operating, but this is more than offset by constantly utilizing this waste heat.

Cleaning and Disinfecting Respirators*

RESPIRATORS, particularly the facepieces, should be scrubbed daily after use with lukewarm water and soap. This not only is good hygienic practice but also prolongs the life of the rubber, as otherwise the dirt, oil, and perspiration from the face may cause rapid deterioration. If a respirator is worn by the same person, disinfection once a week probably should be satisfactory in most instances, depending on conditions of use and thoroughness of cleansing with soap and water. A respirator that has been worn once should be disinfected before it is given to another person to wear.

There are several procedures for disinfecting respirators; however, as

certain respirator parts may be damaged by the disinfecting agent, the manufacturer should be consulted as to the best procedure for his device. This warning is particularly pertinent at present, when the use of substitute materials is so common.

Common disinfecting procedures include scrubbing or immersing the respirator for 10 minutes in 70 percent alcohol, 2 percent cresol, or a solution of formalin made by mixing 1 part of 40 percent formaldehyde in 9 parts of water. When such agents as cresols are employed as disinfectants, the parts that come in contact with the skin should be rinsed thoroughly with water, as some persons are highly sensitive to such materials.

Cleansing and disinfecting afford an opportunity for cleaning or replacing

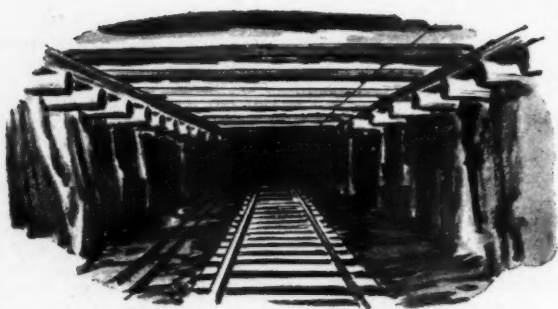
filters, inspecting valves, headbands, facepieces, and metal parts that might be distorted.

Washing and disinfecting the device afford an opportunity to inspect it for minor repairs. In addition, it should be inspected thoroughly at monthly or longer intervals, depending on the apparatus, conditions of use, and storage. After the equipment has been cleaned and inspected and any necessary repairs are made, it should be stored properly. Storage should be in essentially dust-proof containers away from sunlight and in a cool place (not near radiators or steam pipes). Small devices, such as dust or chemical cartridge respirators, can be kept in paper or cellophane bags. This program may be facilitated by assigning two respirators to each person, one being used while the other is being serviced.

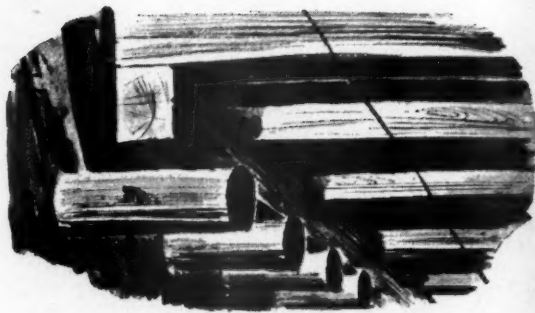
* From U. S. Bureau of Mines I. C. 7236 "Selection, Use and Maintenance of Respiratory Protective Devices" by H. H. Schrenk and S. J. Pearce.

Pressure-Treated Timber

helps conserve materials and manpower at Isabella Mine



This mine (Isabella Mine of Weirton Steel Co.)—which incidentally broke all past production records 7 months out of 10 in '42—is using a "Rib-hitch" plan of roof support so that locomotive or car derailments will not wreck timbering, and sprag mine operation.



This close-up of a section on a main haulage-way shows an "all wood" installation. A treated wood pin, sawn from a 6-in. diameter post, is set in a hole or "hitch" drilled 3 to 4 feet deep, and is firmly wedged in place. These pins support pressure-treated wood crossbars and stringers.



Pillars in this abandoned slope bottom (soon to be tapped and become an intake airway) had been robbed for house-coal, leaving extreme widths of unsupported roof. Cribs of pressure-treated wood were used as illustrated here to guard against falls for required life of airway.



Pressure-treated lumber can take over *your* roof support jobs, help you conserve materials and man power, eliminate many production delays. This bulletin, covering a study by the Committee on Roof Action of American Mining Congress, eliminates figure work. Want a copy?

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Underground Belt Conveyors

A Preliminary Report Submitted to the Conveyor Committee, Outlining Belt Construction Specifications and Maintenance Practices Recommended for Mining Services—By Charles W. Gilmer

General

WHEN CONSIDERING underground coal conveyor systems, it is necessary to distinguish between the two types of operations encountered: (1) the larger capacity permanent installations which serve, as transport lines in the main entries and up the slopes to the surface, and (2) the mobile extensible units, for laterals, butt entries and rooms, which do not exceed a belt width of 30 in.

The first type of installation is typical of standard belt conveyor operations as encountered on any permanent surface job, and therefore the selection and application of the belt follows correctly along generally accepted, and established, lines of standard practice.

The second type of underground coal conveyor, made of light portable sections, should be considered more as a specialized application, and the selection of the belt to be used must be based, to a large extent, on specific conditions known to exist, or that may be anticipated on the particular mining operation involved. As compared to the conventional type of belt conveyor for permanent installations, this application is comparatively new, and is still in the course of development as far as practice is concerned. The purpose of this report, therefore, is to confirm present day practice as far as it has been established with relation to the specifications of the belt itself, and to also provide certain fundamental information that may lead to a further improvement and standardization of this most important phase of the subject.

Underground Belts—Operating Conditions

The operation of underground belt conveyors is usually such as to involve many of the conditions encountered in belt conveyor service generally, but in

addition there is always the possibility of exposure to certain other operating hazards peculiar to the type of service—and under physical conditions much less favorable to their detection and correction. Conveyor belts on underground installations may be subjected to any or all of the following:

1. Heavy loading conditions. This is further aggravated by side loading, and will, of course, vary with the size and type of the coal handled. (Note: A special report on belt loading methods is now in preparation by the Committee.)

2. Abrasion and resultant cover wear, together with impact from lump material.

3. Gouging and tearing. This is usually the result of loading conditions, but may also occur where there is not sufficient clearance between the roof and large lumps of coal on the belt, causing the lumps to jam between the roof and the moving belt.

4. Edge wear caused by belts training improperly and rubbing on pulley housings and other parts of the equipment. Misalignment of the equipment itself may be the cause, but the same

conditions will occur if splices are not square or if the belt is not troughing properly.

5. Moisture encountered in some mines will have a cumulative deteriorating effect on the belt carcass when exposed through injury, and this may be particularly destructive if sulphur is present.

6. The compactness of the equipment required for underground work is such that small pulleys must be used, placing considerable bending stress on the belt. Also frozen idler rollers, not easily detected underground, will contribute to excessive wear.

7. Excess greasing of idlers is the tendency underground, and this grease transferred to the belt, leads to its premature failure by affecting both cover and carcass.

8. In addition to all other factors, many operators have had no previous experience with belt conveyors, and consequently installations are required to operate under most unfavorable conditions until the necessary experience is gained.

Belting Specifications

Rubber conveyor belts are available in a wide range of construction that provides a great many different combinations of carcass and cover. Careful consideration should be given to adopting the construction that will



Regular inspection reveals two conditions which need correction. Pulley at left leaks grease as does the one being inspected. As pulley revolves centrifugal force may throw grease on the belt surface



A troughed 26-in. conveyor taking the run-of-the-mine

best meet the requirements of underground service in a general way, and also to meet any known specific conditions on a particular job. To make a proper selection of a belt it is necessary to understand all factors that have a bearing upon its performance, and to have a knowledge of the qualifications of various belt constructions to meet operating conditions. Admittedly, the majority of underground operations are so closely similar in character that this should lead to a standardization of belt constructions that could quite correctly be accepted by the industry.

The foundation of most rubber belts is a carcass of woven cotton duck plies or cotton cord plies in combination with duck, especially designed for conveyor service. The cord type of belt is relatively new and the majority of belts in use up to the present time are therefore of duck construction. The carcass must be sufficiently strong to handle the stresses developed, must be flexible crosswise for proper troughing, and must have ruggedness to withstand impact and general abuse.

Conveyor belt ducks are available in 28 oz., 32 oz., 36 oz., 42 oz., and even 48 oz. weights, which permits a broad selection to meet any requirement.

The rubber used to unite the plies of duck or cord into the finished belt is known as the "friction," and assures a homogeneous structure capa-

ble of withstanding repeated flexing and bending in service without mechanical breakdown. It is essential that the friction penetrates throughout the duck or cord to obtain a satisfactory bond. Skim coats are thin layers of rubber, usually about .005 in., that are inserted between the plies to supplement the value of the "friction" and to provide additional cushioning in the belt carcass.

The conveyor belt cover is the protective armour for the carcass against abrasion and other damaging factors. Covers are also available in various qualities to suit service conditions, and their selection, as to grade and thickness, should be in a balanced relationship with the carcass used. Belting manufacturers will gladly advise on this point.

While some 28 oz. and 32 oz. duck constructions are in use and have been quite satisfactory on certain installations, these lighter ducks are hardly safe in less than 5 plies if proper body is maintained in the belt, and even though additional plies are used, the belt construction is quite limited in tensile strength. Furthermore, the small diameter head and drive pulleys used on underground equipment makes it inadvisable to use a greater number of plies of these lighter ducks to obtain additional strength.

The trend in the selection of underground belts appears to be, correctly, toward utilizing the heavier and

stronger ducks in comparatively fewer plies to obtain a more rugged belt construction throughout, and also to get the maximum tension capacity with a minimum number of plies; cord construction also fall in this category. Thirty-six oz., 42 oz., and 48 oz. ducks, admirably fit this picture and point the way to a more definite standardization of underground belts in the future; this also applies to the cotton cord construction which also offers the same possibility. These heavier ducks in 4 plies, because of their rugged character, are best adapted to the requirements of underground service—36 oz. where tensions are low, 42 oz. for the heavier jobs, and 48 oz. for the more extreme load stresses. Furthermore, extensible underground conveyor units may at times be required to operate on centers as long as 3,000 ft. often with unfavorable grades, with resultant high belt stress. Since width is limited, the number of plies that can be used is also limited if a properly troughing belt is obtained, the strongest belt possible in the least number of plies is therefore desirable.

As mentioned before, rubber belts are available in a large number of quality and construction combinations, depending upon the particular service involved. The severity of underground service, from this standpoint alone, would justify the selection of the best quality and heaviest construction possible to operate satisfactorily on the equipment. However, there are certain factors peculiar to underground operations that have a qualifying influence on this point, and have led to a more general use of what may be termed an intermediate grade, and also have placed some limitation on the maximum cover thickness advisable for the service. It has been found that on some underground installation, particularly the initial ones, the belt itself is not actually worn out but rather is retired from service because of abnormal exposure to the numerous hazards we have previously mentioned. In the majority of cases this is due to inexperience on the part of the operators, which results in lack of the necessary control over these destructive factors. During the time that this condition exists, it is hardly economical to place the best and most costly belt construction in service, as its full value cannot be realized, and it has been evident that the lower priced intermediate construction of good, but lower quality, returns the best average belt life reflected in cost per ton. As practice develops and mine operators become more familiar with the proper care and operation of belt conveyors, we may expect a general improvement in this situation, with a resultant increase in belt life. Along this line, in other parts of this report, information is given on the care and maintenance of conveyor belts that is in-

tended to bring out the additional service value that may be obtained through improved operating methods.

In some cases there is a tendency to explore the possibilities of using even more economical belt constructions for underground work, even to the extent of a 4-ply rubber belt having no rubber cover at all, but with the plies heavily impregnated with rubber friction. This application is at present on a trial basis, but it is not improbable that this may have merit on certain installations where a minimum of first cost is a definite requirement. More history and data on such installations will be necessary before their practical utility can be determined.

As a general standard for underground work, using the 26 in. or 30 in. belt widths, practice is very definitely leaning toward the use of 4 plies of the heavier ducks—or cord in combination with duck—using an intermediate grade of covers and friction between the plies—the cover standard quite generally accepted is $\frac{1}{8}$ in. thickness on the top side and $\frac{1}{32}$ in. on the bottom. Skim costs are usually incorporated in these belts. There are, of course, variations from these standards in certain mines that have proved satisfactory in meeting specific conditions, either mild or severe, as the case may be.

Underground Conveyors—Flat

While flat conveyor systems are used to some extent, these are relatively few as compared to troughed conveyors, and their use appears to be somewhat limited. Our report, therefore, deals primarily with the troughed type, although in general, with the exception of belt construction, it would apply to the flat system. The construction of the belt used on flat conveyors has become definitely standardized because of the special design of the equipment, and it is therefore recommended that the belting specifications adopted by the manufacturer of such equipment, be accepted where systems of this type are used.

Belt Maintenance and Repair

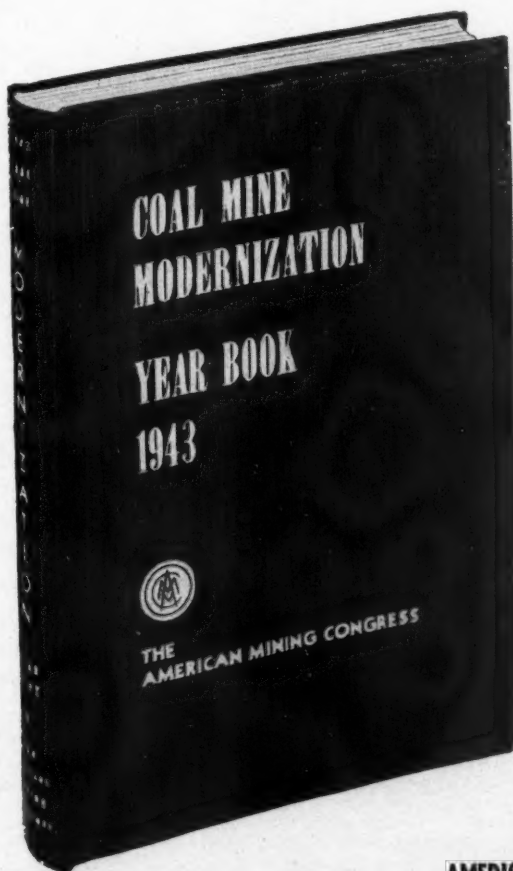
When operating conveyor belts underground, exposed to the many hazards and abuse that are always impending, it is necessary that they should be given constant attention and supervision if the maximum service life is to be obtained. This is no more than may be expected with any valuable equipment. The cost of such supervision and maintenance is extremely small, considering the investment involved, and without exception is justified in the additional value received from the belts and extra tonnage return from their uninterrupted operation.

Belts operating underground should be carefully checked for alignment at the time of installation and also while they are in service. This keeps the belt running straight, prevents edge wear, and maintains production at required levels.

Belts should be inspected periodically to detect cuts and snags in the cover, gouges and breaks in the carcass. When such damage occurs, steps should be taken immediately to make suitable emergency repairs to prevent serious deterioration of the whole belt. This is particularly important when the belt is exposed to moisture and when handling a mixture of lump and fine materials, as is done in underground service. Very suitable and serviceable repairs can be made to the belts right on the job without the need of any special equipment whatever. There are a number of repair materials available on the market today, furnished in kit form, with which an excellent repair can be made without

the use of any vulcanizing equipment.

Where a mine is operating a large footage of Conveyor Belts, and the amount of repair work justifies the purchase of vulcanizing equipment, this is obtainable at reasonable cost and in the proper design for such work. Vulcanized repair jobs are more permanent, and the technique followed in making these, comes closer to restoring the belt to its original condition than any other method. Where belts have suffered major accidents such as carcass breaks, extensive tearing, etc., requiring the replacement of portions of the duck plies themselves, such repairs can only be made satisfactorily with vulcanizing equipment, the use of which soon becomes a matter of routine with a properly instructed mechanic. Many operating companies have complete vulcanizing facilities in the hands of a competent maintenance crew that is continually servicing their belts, cables and their equipment.



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AMERICAN MINING CONGRESS
Washington, D. C.

Steel gooseneck



Information supplied by an Industrial Publication

The problem of breakage of the water gooseneck connection to a modern rock drill has been greatly aggravated by the present rubber shortage. When such breakage can assume the proportion of several hundreds of feet of water hose ruined per month, this problem cannot be overlooked.

Due to the constant flexing of the ten or twelve inch length of hose used in the gooseneck, it tends to fail prematurely under the high water pressure. Failure during operation may easily

mean the loss of several man-hours of production.

This problem has been completely solved by a large Western mining company by the elimination of such hose and the use of a metal gooseneck in its stead. The device is turned from seamless steel tubing and formed into a long sweep bend to facilitate the clearance of throttle and air hose connections.

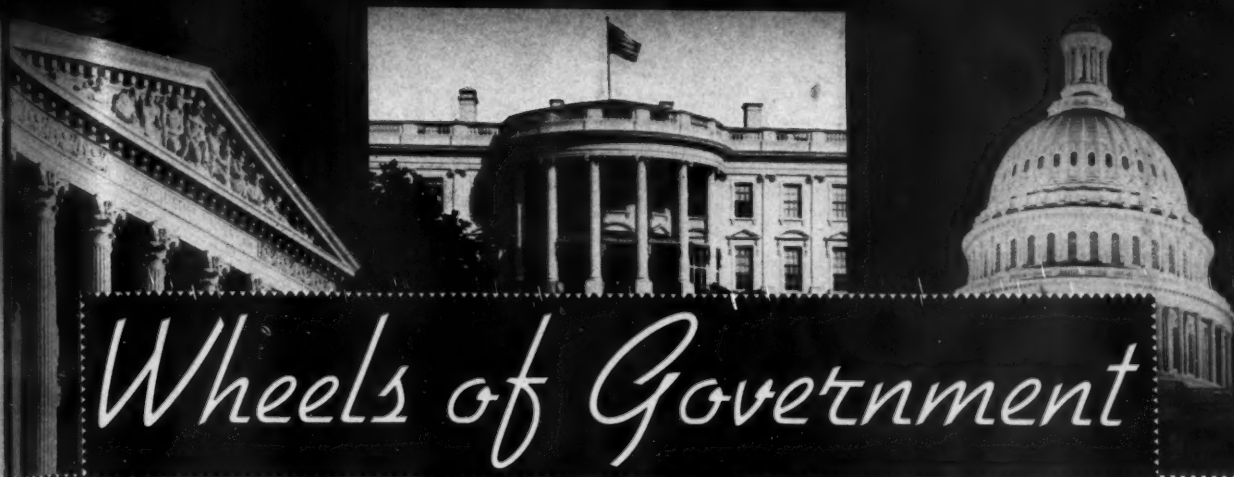
In this case the substitute has proven more successful than the conventional hose.

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Wheels of Government

As Viewed by A. W. Dickinson of the American Mining Congress

UNLESS some demand comes from the White House for eleventh-hour consideration of special legislation the Congress will clear the boards for adjournment early in July. Departmental supply bills have been pushed through at an unprecedented rate and a lot of measures which are dear to the hearts of their sponsors in House and Senate will just have to wait until the Congress reconvenes after Labor Day.

The terms of the resolution under which the congressional recess will run until about September 13 are unusual. Normally Congress does not reconvene during a recess except at the call of the President or unless a specific date has been fixed. Under the present resolution, Congress may be recalled by the House Speaker and the Vice President or on the request of the Minority Leaders.

"Assistant President" Jimmy Byrnes has been elevated from his former post as Director of the Office of Economic Stabilization, to Director of the "Office of War Mobilization," the new super-agency now directing our military and civilian affairs. In his new office Byrnes has under him the War Mobilization Committee which includes in its personnel Secretary of War Stimson, Secretary of Navy Knox, Chairman of the Munitions Assignment Board Harry Hopkins, WPB Chairman Donald Nelson, and the newly-appointed Economic Stabilization Director Fred M. Vinson, recently a Federal judge and previously for many years a Congressman from Kentucky and member of the House Committee on Ways and Means. Primary job of the OWM is to unify all Federal activities concerned with military and civilian supply and to settle controversies between agencies and departments.

Uncle Sam—Coal Miner

Following the May 25 award by the War Labor Board granting coal miners an increase in vacation pay

★★★★★★★★★★★★★★★★

Washington Highlights

Congress: "Let's go home."

Super-Agency: Office of War Mobilization Directs Affairs.

Stabilization: Fred Vinson of Kentucky, new Economic Stabilization Director.

Coal Mines: Now operated by Uncle Sam.

Portal-to-Portal: War Labor Board adopts "Hands-Off" Policy.

Anti-Strike: Connally-Smith Law Gives Real Power to WLB.

Guffey Act: Time is short for extension.

Recruit Miners: Western mines need men from shipyards, Army and Mexico.

Tax Bill: No more taxes on 1943 incomes.

\$50 Billion: Tax goal for 1944.

Trade Agreements: Congress approves Secretary Hull's Bill.

Silver: Green Bill passes Senate. Makes Treasury silver available to industry.

★★★★★★★★★★★★★★★★

and eliminating certain charges for lamps, tools, and blacksmithing, joint wage negotiations were resumed on the issue of portal-to-portal pay. These negotiations broke down and the mines remained idle from midnight May 31 until June 7. Under the orders of the President, Fuel Administrator for War Ickes, and the Miner's Policy Committee, the men resumed work in the mines while the case features of underground travel pay were presented by the mine operators before the War Labor Board.

During the hearing and the joint wage negotiations, it became known

that Illinois operators had tentatively agreed to a portal-to-portal pay of \$1.50; Central Pennsylvania operators had withdrawn from the joint conference and tentatively agreed on a basis of \$1.30, but their further negotiations failed because the miners would not protect the operators, after April 1, 1944, against back-pay claims which might under the Fair Labor Standards Act extend back to 1938.

On June 18, the War Labor Board rejected the miners' demand for portal-to-portal pay stating that "the mine workers remain free to place their demands before the Administrator of the Fair Labor Standards Act and in the Federal Courts, and the operators retain their rights to seek pertinent administrative and court rulings." The Board further said "the parties also remain free to agree to a settlement of their prospective lawsuit. If they should agree to a settlement, the Board, as an agency of Government charged with the administration of the wage stabilization program, will rule whether the agreement is a genuine settlement of the lawsuit compatible with the stabilization program."

Upon expiration of the working truce at midnight June 20, the coal miners again remained away from the mines until ordered back on the morning of June 24 by Administrator Ickes and the UMW policy committee. The union stated that the miners will continue to work until October 31, pending the effort of their leaders to make an underground travel pay agreement either with the operators or the Fuel Administrator for War.

Secretary Ickes on June 25 called 29 leading operators to a conference in Washington, receiving from them assurances of full cooperation with the Government in carrying out the program of Federal mine control. The operators appointed the following committee "to confer further with the Secretary and his staff and to consult as to details of the program":

Heath S. Clark, president, Rochester & Pittsburgh Coal Co., Indiana, Pa.

James D. Francis, president, Island Creek Coal Co., Huntington, W. Va.

J. B. Morrow, president, Pittsburgh Coal Co., Pittsburgh, Pa.

Eugene McAuliffe, president, Union Pacific Coal Co., Omaha, Nebr.

W. L. Robison, president, Youghiogheny & Ohio Coal Co., Cleveland, Ohio.

Harry M. Moses, president, H. C. Frick Coke Co., Pittsburgh, Pa.

J. P. Williams, Jr., vice president, Koppers Coal Division, Eastern Gas and Fuel Associates, Pittsburgh, Pa.

C. C. Dickinson, president, Dickinson Fuel Co., Charleston, W. Va.

Meanwhile, with the subpoena powers granted to the War Labor Board by passage of the Connally-Smith Anti-Strike Act, it is thought possible that the Board may call John L. Lewis before it for a statement of his position concerning the Board order to execute a contract with the coal operators.

Connally-Smith Bill Becomes Law

The country was electrified June 25 by the immediate passage over presidential veto of the Connally-Smith Anti-Strike Bill which had been on the President's desk for 10 days. Overriding votes of 56-25 and 244-108 in the Senate and House, respectively, gave unmistakable evidence of the grim determination of Congress to provide control mechanism for outlawing strikes during the present emergency.

As it now becomes a law, the Connally-Smith measure reinforces the power of the President to take over strike-bound or strike-threatened plants manufacturing, producing, or mining any articles or materials required or useful in connection with the war effort.

It permits Federal agencies operating plants, or a majority of the plant employees to apply to the War Labor Board for changes in wages or other conditions of employment, and authorizes the Board to render decisions and issue orders thereupon; provides fine of \$5,000, imprisonment for one year or both for anyone inducing or encouraging interference with the operation of plants in the possession of the United States; empowers WLB to take jurisdiction of labor disputes, conduct hearings, subpoena witnesses and documents, decide disputes and render orders; it requires 30 days' notice of a labor dispute, which threatens to interrupt war production, to the Secretary of Labor, National War Labor Board and the National Labor Relations Board, whereupon the NLRB is to conduct a secret ballot of employees on the 30th day after notice is given, on the question of permitting

such an interruption of war production; it prohibits campaign-fund contributions from labor organizations or corporations, with a penalty of \$5,000 fine and also a fine of \$1,000, one year imprisonment, or both, against officers of corporations or unions held in violation; Board members are forbidden to participate in any decision in which such a member has a direct pecuniary interest as an officer, employee or representative of either party involved in the dispute.

This last provision, while its exact application has not been determined, will affect Board members from CIO, AFL or other unions in certain cases. It is believed by many that another provision in the bill, which requires the WLB to conform to the National Labor Relations Act, would prohibit the award of a closed shop or "maintenance of membership" clause. The theory is that under Section 8 of the NLRB, discrimination in employment by encouraging or discouraging membership in a union is designated as an "unfair labor practice."

Hearing on Guffey Act

Beginning June 21, hearings have been proceeding before the Ways and Means Committee on a bill sponsored by the Bituminous Coal Division, Department of Interior, and on a bill sponsored by the United Mine Workers of America. The first would extend the Coal Act to two years after the end of the war, but the latter would extend it indefinitely and restore the original Commission form of administration. Many of the Ways and Means Committee members at the hearings, already thoroughly tired with their long struggle over revenue measures, have been quite sharp and critical in their questioning of the proponent witnesses.

With Congress on the eve of a summer adjournment, prospects for enactment of the law appear quite uncertain, the present expiration date, August 24, is approximately three weeks before the reconvening of Congress.

Recruit Miners

With over 6,000 miners now needed in non-ferrous metal mines of the West, the War Manpower Commission and War Production Board are making determined efforts to relieve this situation, brought about by the military induction of workmen and the heavy exodus from the mines to the war industries of the Pacific Coast.

A month ago Western regional directors of WMC met in San Francisco and initiated a close examination of the pay rolls of the coast industries by the U. S. Employment Service, to locate former mine, mill and smelter workers and arrange to send them back to the mining districts.

To counteract a serious loss of miners to the farms and ranches this spring, WMC Chairman McNutt, General Hershey of Selective Service, and Chester Davis of the Food Administration, have stated through the regional directors that "the production of metals and the production of food are each vital for victory; neither is more important than the other. Workers in the mines, mills and smelters and workers on the farms will help America win the war by staying on the job they know best."

Also, there is now hope that Mexican mine labor in limited numbers will soon begin to flow to the mines of the Southwest. Unless sufficient remedies can be found for the present manpower shortage in the mines, it is now generally accepted that further resort must be had to additional furloughing of soldier miners. It is possible that prisoners of war may be used on railroads and open-cut mining works in such manner as to relieve some of the labor at present employed in these occupations for possible service underground.

Tax Talk

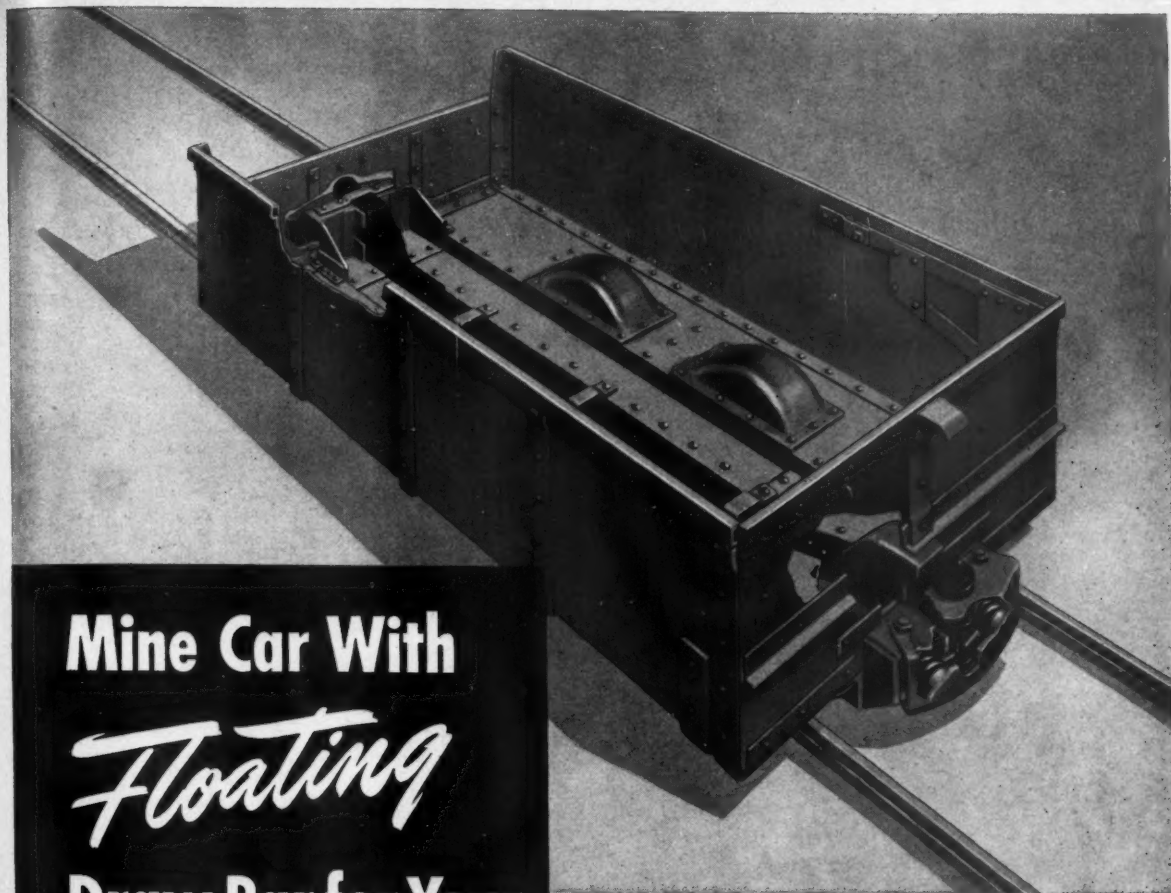
Approved by the President on June 9, the pay-as-you-go tax bill had previously received final House approval by a vote of 256-114, with Senate endorsement to the tune of 62-19.

Administration feelers as to early enactment of another tax bill have been rebuffed by both House and Senate leaders. Treasury's Secretary Morgenthau has now agreed that there shall be no new tax bill enacted which will apply to individual or corporate income for 1943. Original Treasury demands for \$16 billion additional revenue have been trimmed down to \$12 billion with the announced objective of \$50 billion in total tax revenue for 1944.

Four Ways and Means Subcommittees have been appointed, to consider pending legislation on renegotiation of contracts; on bills repealing the Silver Purchase Act of 1934 and authorizing sale of Treasury-held silver; on post-war planning; and on miscellaneous matters. It is evident that plans call for study of these many bills by the subcommittees during and immediately following the congressional recess, with action on the measures to follow the return of Congress in the fall.

More Trade Agreements

State Secretary Cordell Hull's foreign trade agreements program prevailed again when the Senate by a vote of 59-23 approved the House version of the bill extending the authority. As signed by the President, the authority is limited to two years instead of three and the measure contains a provision that most-favored-
(Continued on page 73)



Mine Car With *Floating* Draw Bar for Your Victory Tonnages

Phantom view of Bethlehem's new mine car. Note at each end the spring buff and draft connected by the floating draw bar.

Here is the new, sturdier mine car needed in today's high-pressure production—a mine car with ends that can never pull off. This new Bethlehem Mine Car stands up better in hard service because of its floating draw bar, a sturdy steel member running free from end to end inside the car, and transmitting the pull as well as shocks through draft springs to the rear end of the car.

Here's how it works. When the car is traveling in either direction the pull at the front is always transmitted through the floating draw bar to the springs at the back end of the car.

In this way, the rear springs are the ones compressed; there is no

pull on the front end of the car at any time. This action tends to push the car from the rear instead of pull it from the front. It prevents the ends from being pulled off. When used in a train there is no strain on the individual car; the pull is transmitted directly from one draw bar to the next.

Furthermore, the outside location of the springs eliminates spring failure resulting from corrosive action of the coal.

Bethlehem will be glad to give you more details of this new-type mine car. Get in touch with the nearest Bethlehem representative, or write direct to Bethlehem Steel Company, Bethlehem, Pa.

Other Bethlehem products to help you turn out Victory tonnages:

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1943-1944 WILL BE A LONG COLD WINTER

Avoid costly shut-downs that seriously hamper production. Thoroughly check and examine all of your equipment now to be sure it is ready for a long hard winter, or better yet, send for a Holmes Engineer to give your plant a complete check-up. He will be glad to give you recommendations based on years of practical experience.

In going over your plant use this list checking items needing repairs or replacements

CONVEYORS

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- FLIGHTS ☐
- PANS ☐
- BEARINGS ☐
- SHAFTING ☐

HOISTS

- DRUMS ☐
- SHAFTING ☐
- SPIDERS ☐
- MOTORS ☐
- ENGINE PARTS ☐
- CABLES ☐

RETARDERS

- DRUMS ☐
- SHAFTING ☐
- BEARINGS ☐
- CABLES ☐

ELEVATORS

- SPROCKETS ☐
- CHAINS ☐
- BUCKETS ☐
- CASING ☐
- BEARINGS ☐
- SHAFTING ☐

SHAKERS

- SCREENS ☐
- HANGERS ☐
- BEARINGS ☐
- SHAFTING ☐
- ECCENTRICS ☐
- DRIVES ☐

CAGES

- BAIL ☐
- PLATFORM ☐

SHEAVE WHEELS

- SHAFTS ☐
- BEARINGS ☐

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PERSONALS

Carl Eldridge Newton, president of the Chesapeake & Ohio Railway, has been appointed Deputy Federal Coal Mine Administrator to discharge the functions in the operation of the nation's coal mines, now under the custody of the Government. Mr. Newton has followed the legal profession as a railroad counsel, and has also directed administrative and reorganization matters for a wide range of in-



Carl E. Newton

dustries, among which were oil, chemicals, minerals, electrical products and aviation. During the railroad reorganization in the 30s he entered into executive management and was elected a director of the Chesapeake & Ohio Railway in April, 1942, subsequently becoming president of the company. This carrier is the largest originating bituminous coal carrier serving the nation's major fuel industry in the normal economy.

T. J. Thomas has been appointed Director of Production for Coal Mine Operations, Office of Federal Coal Mine Administrator. Mr. Thomas has



T. J. Thomas

been in Washington as Associate Director of Bituminous Coal, Office of Solid Fuels Coordination, on leave of

absence from his duties as president and chairman of the executive committee of the Valier Coal Company, and assistant to the president of the Chicago, Burlington & Quincy Railway Company. He is also a member of the Board of Directors of the Crow's Nest Pass Coal Company, Ltd., of Fernie, British Columbia, and he has served for some time on the advisory council of the Coal Division, American Mining Congress.

Due to the increasing demand for its services, the Coal Bureau of the Upper Monongahela Valley Association, with offices in Fairmont, W. Va., and New York City, has added to its technical staff Edmund McCarthy, fuel engineer, of New York City. Mr. McCarthy is a graduate mechanical engineer, a licensed professional engineer, and a member of the American Society of Mechanical Engineers.

Frank J. Smith, of the Oglebay Norton Company, and William H. Schacht, of the Copper Range Company, were reappointed by Governor Kelly, of Michigan, to the Board of Control of the Michigan College of Mining and Technology.

George C. Lipsey, mine superintendent, Britannia Mining & Smelting Co., Ltd., B. C., recently returned to his office after an extensive visit through northern Ontario and Quebec, studying mining methods in the Porcupine, Kirkland Lake, Cadillac, Noranda, Beattie, Malartic, and Sudbury mining districts.

H. A. Treadwell, formerly general superintendent, Chicago, Wilmington & Franklin Coal Company, was recently elected a vice president of the company. John Rodenbush succeeds Mr. Treadwell as general superintendent. F. Earl Snarr has been made superintendent of the company's Orient No. 1 coal mine.

At a recent meeting of the Metaline Mining and Leasing Company, Spokane, Wash., the following were elected directors: W. D. Chandler, president; D. I. Hayes, vice president and general manager; V. T. Tustin, H. L. Schermerhorn and B. L. Coomes, all of Spokane. Howard I. Young retired from the presidency at the expiration of his term.

Harry W. Meador was recently made vice president and general manager of the Stonega Coke and Coal Co., Big Stone Gap, Va. Other changes in the company's operating staff include the appointments of W. C. Schott, division superintendent over mines at Imboden, Osage, Stonega and Roda No. 3; D. E. Polly, division mine superintendent of the Arno, Derby, Dunbar and Roda No. 5 Mines; J. M. Lowman succeeds Mr. Schott as superintendent of the Stonega Mine and B. M. Neel is superintendent of the Derby Mine.

William X. Baxter, engineer for the Montreal Mining Company, at Montreal, Wis., has been made chief engineer for the Castile Mining Company, at Ramsay, Mich.

Capt. Gerald E. Eddy, formerly assistant appraiser of mines with the Michigan Geological Survey, has recently returned to this country. He has been assigned to geological work with the Air Corps.

Kenneth Lambert resigned his position as superintendent of the Loree Division of the Hudson Coal Company to become general manager of the Jermyn-Green Coal Company, which operates mines in the Pittston and Pottsville areas. Fred Zollinger, superintendent of the Hudson Marvina Colliery, will succeed Mr. Lambert at Loree. August Weigand, superintendent at Coalbrook, will succeed Mr. Zollinger at Marvina.

G. J. Ballmer, assistant superintendent, Nevada Consolidated Copper Company, Santa Rita, N. Mex., re-



G. J. Ballmer

cently received the honorary degree of engineer of mines from the New Mexico School of Mines, Socorro, N. Mex.

E. E. Jones, general superintendent, Winding Gulf Collieries and Lamar Collieries Company, was recently elected vice president and general manager in charge of these companies' operations. His headquarters are at Charleston, W. Va.

F. Edgar Kudlick has accepted a position as special engineer for the Jeddo-Highland Coal Company, Jeddo, Pa.

The appointment of Herbert G. Dillon as manager of the newly-formed mining section of the Industrial Department has been announced by the Westinghouse Electric and Manufacturing Company.

A native of Woodward, Okla., Mr. Dillon joined Westinghouse in 1923 shortly after his graduation from



Herbert G. Dillon

Oklahoma A. & M. with a degree of Bachelor of Science in Electrical Engineering.

From 1933 to 1941 he was sales engineer with the General Motors Corporation. He moved from there to the Lee Norse Co., serving as sales manager until his appointment by Westinghouse as manager of the mining section.

A joint fuels conference of the American Institute of Mining Engineers and American Society of Mechanical Engineers will be held at the William Penn Hotel, Pittsburgh, Pa., on Thursday and Friday, October 28 and 29. A general committee established by representatives of the two associations consists of: T. E. Purcell chairman, H. F. Hebley, L. E. F. Wahrenburg, A. W. Thorsen, T. J. Barry and H. P. Greenwald. The group, already at work to insure the success of this timely and important conference, has appointed several subcommittees headed by the following chairmen: T. J. Barry, arrangements; Martin A. Mayers, program and papers; M. R. McConnell, inspection trips; J. T. Ryan, Jr., publicity; G. A. Shoemaker, hotel and registration.

Theodore Pilger, consulting mining engineer, 70 Wall Street, New York, N. Y., recently left for Mexico City as technical advisor for Financiera Tecnica de Mexico, S. A., whose offices are at Venustiano Carranza 53, Despacho 11, Mexico, D. F. This new company was organized by J. Lacaud y Cia, investment bankers of Mexico City, and Houston & Jolles, financial and industrial consultants of New York, to assist Mexican industry through financing and the furnishing of technical and managerial services.

L. French Workman has been appointed general superintendent of the Lorado Coal Mining Company, Lorado, W. Va.

B. A. Stimmel, superintendent of the zinc plant of the Consolidated Mining and Smelting Company, Trail, B. C., recently retired due to ill health. James Buchanan, general manager of the company, has announced that W. S. Kirkpatrick, formerly at Calgary, will return to Trail and become assistant general manager. L. M. DeLong has become superintendent of the zinc leaching plant; Dr. C. H. Wright has become consulting chemical engineer; and James Bryden and D. S. Whitmore have joined the metallurgical staff.

E. W. Martin has been elected president of the Wyatt Coal Company, MacAlpin Coal Company and the Wyatt Coal Sales Company. Mr. Martin started to work for the Wyatt Coal Company as assistant superintendent in 1918 and has enjoyed successful promotions to the positions of superintendent, general superintendent, vice president and president. Other officers recently elected to the Wyatt organization are James S. Conley, vice president, Wyatt Coal Company; A. W. Laing, Sr., vice president, MacAlpin Coal Company; G. K. Blanchard, vice president, Wyatt Coal Sales Company; and J. O. Jenkins, secretary-treasurer, Wyatt Coal Company, MacAlpin Coal Company and the Wyatt Coal Sales Co.

Charles Nailler, formerly superintendent of the Willow Grove No. 10 Mine of the Hanna Coal Company, Neffs, Ohio, was recently made production manager for all the company's



Charles Nailler

mines. R. L. Wilhelm, formerly superintendent of the Piney Fork Mine, succeeds Mr. Nailler as superintendent at Willow Grove. James Riley is now superintendent at Piney Fork. All the company's stripping operations are now in charge of J. S. Harmon.

Ross Roundy, mine operator of Wallace, Idaho, recently inspected the Lone Star mine, near Conconully, Wash., which has been acquired by Judge A. H. Featherstone and associates in Wallace.

T. J. O'Brien, president, Kemmerer Coal Company, and L. R. Weber, president, Liberty Fuel Company, Salt Lake City, and inter-mountain coal operators, now head Districts 19 and 20, respectively, for the Bituminous Coal Producers Board.

Geo. S. Lockwood recently succeeded C. O. Applehagen, retired, as manager of the Northwest Coal Division of Pickands Mather & Co. at Duluth.

Fred O. Davis of the Potash Company of America, Carlsbad, N. Mex., has been elected president of the New Mexico Miners & Prospectors Association of New Mexico.

— Obituary —

Angus MacArthur, 54, vice president and director of the Koppers Company, Pittsburgh, Pa., died of heart failure in May.

Thomas Sullivan, 67, one time superintendent of the Silver Cable mine near Mullen, Idaho, died June 16.

Roy V. Myers, vice president of the Myers-Whaley Company, Knoxville, Tenn., died at his home in Los Angeles, Calif., on June 8, 1943. He was a native of Louisville, Ohio, and a graduate of Ohio State University. From 1895 to 1906 he was mining engineer of the Dayton Coal and Iron Company at Dayton, Tenn., and came to Knoxville in 1906 to practice as a consulting mining engineer and member of the firm of Myers-Whaley, Engineers, and was one of the founders in 1908 of the Myers-Whaley Company, manufacturers of shoveling and loading machines for mine and tunnel work.

In 1917 he raised a company of field artillery, Tennessee National Guard, later the 114th Field Artillery, and served during the war as major in this regiment, part of the 30th Division.

He retired from active work some 20 years ago and had lived in Los Angeles, Calif., since that time.

William M. Weigel, 64, mineral technologist on the staff of the Industrial Development Department of the Missouri Pacific Railway, died on March 26 in St. Louis following a brief illness. Mr. Weigel was associate professor of mining at Pennsylvania State College from 1908 to 1912, and engaged in private mining operations before entering the service of the United States Bureau of Mines as mineral technologist. Mr. Weigel has been with the Missouri Pacific Railway Co. since 1926.

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★ Last year saw nearly 30,000,000 workers voluntarily buying War Bonds through some 175,000 Pay-Roll Savings Plans. And buying these War Bonds at an average rate of practically 10% of their gross pay!

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Sure, there is—but how long is it since you've done anything about it? These plans won't run without winding, any more than your watch! Check up on it today. If it doesn't show substantially more than 10% of your plant's pay-roll going into War Bonds, it needs winding!

And you're the man to wind it! Organize a vigorous drive. In just 6 days, a large airplane manufacturer increased his plant's showing from 35% of employees and 2½% of pay-roll, to 98% of employees and 12% of pay-roll. A large West Coast shipyard keeps participation jacked up to 14% of pay-roll! You can do as well, or better.

By so doing, you help your na-

tion, you help your workers, and you also help yourself. In plant after plant, the successful working out of a Pay-Roll Savings Plan has given labor and management a common interest and a common goal. Company spirit soars. Minor misunderstandings and disputes head downward, and production swings up.

War Bonds will help us win the war, and help close the inflationary gap. And they won't stop working when victory comes! On the contrary—they will furnish a reservoir of purchasing power to help American business re-establish itself in the markets of peace. *Remember, the bond charts of today are the sales curves of tomorrow!*

You've done your bit  Now do your best!

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THE MINING CONGRESS JOURNAL

News and Views

Eastern



States

WEST VIRGINIA

» » » Out of the myriad of directives, orders, edicts, or some other form of mandate that has appeared during the past 12 months, at least one has semblance of being beneficial to the coal industry of West Virginia.

With the mines verging upon a manpower shortage because of inductions into the Army, the Navy, or some other branch of the armed services, plus absenteeism, unavoidable or voluntary, the inclusion of West Virginia into an employment stabilization area has had, generally, a wholesome result.

Mine workers who are inclined to follow some will-o'-the-wisp rumor to the effect that better work is prevalent at some other than their present location, are experiencing difficulty in relocating over night at some mythical place of more satisfactory work. Before a worker can begin his migration several matters must have his attention: (1) The work sought should be available, (2) the worker must be provided with a statement of availability, (3) he may or may not be an in-migrant. The word "in-migrant" appears to be a coined expression to show a certain situation or condition. It is defined by the United States Employment Service of the War Manpower Commission as follows:

"A sound test of whether or not a worker hired by an employer is an 'in-migrant worker' is whether he can and/or does commute to the new employment without changing his place of residence. If it is necessary for him to change his place of residence in order to change employment, he is an in-migrant and can be hired only through the local office of the United States Employment Service serving his new employer, in accordance with provisions embodied in Stabilization Plan, Section I-D (Hiring Procedures). In such instances the worker must pre-

sent to the local office of the United States Employment Service serving the new employer statement of availability from the United States Employment Service office serving his last previous employer engaged in essential industry."

It follows that a worker desiring to change from one mine to another, but who is not an in-migrant, would have to secure a statement of availability from his present employer to present to the prospective employer. If the statement were denied him he can present his request for the statement to his District Employment Service office. Should it again be denied, he can enter his request with the Regional Employment Service having jurisdiction. Should it again be denied he is just plain out of luck, in so far as making the contemplated move is concerned. In actual practice, however, most employers would rather issue the statement of availability

than try to hold a worker with them against his will, on the premise that whatever work the employe might perform thereafter would be depreciated by indifference.

If the worker is discharged for any reason he is to be supplied with the statement of availability, but the employer issuing the statement should be careful to not make any entry on the statement that is not indicated on the form prescribed. The regulation is already getting results, which will be more apparent as it comes to be more generally understood and accepted.

Power Committee Meeting

The Mining Congress Committee on Underground Power with C. C. Ballard, chairman, held a meeting at the Beckley Hotel, Beckley, W. Va., June 4-5, to discuss the subcommittee studies on the use of power in coal mining. Several reports of great importance to the mining industry are being prepared for early publication in the MINING CONGRESS JOURNAL including "Color Standardization for Wire Terminals," "A.C. High Voltage Lines Underground," "A.C. Power for



The Underground Power Committee of the Coal Division, American Mining Congress held its meeting at the Beckley Hotel, Beckley, W. Va.

Machines at the Working Face," "Methods of splicing, vulcanizing, and maintaining cables with synthetic rubber coverings." The following members were present: C. C. Ballard, chairman, The New River Co.; Donald J. Baker, I-T-E Circuit Breaker Co.; Paul M. Barlow, West Virginia Department of Mines; M. K. Clay, Raleigh Coal and Coke Co.; J. O. Cree, West Virginia Engineering Co.; C. O. Gallagher, Koppers Coal Division; R. A. Gray, Rome Cable Corp.; L. C. Hilsley, U. S. Bureau of Mines; A. L. Johnston, Electric Railway Equipment Co.; R. G. Jones, Sullivan Machinery Co.; C. B. Llewellyn, Rome Cable Corp.; D. E. Renshaw, Westinghouse Electric & Manufacturing Co.; W. F. Roberts, Jeffrey Mfg. Co.; R. S. Sage, General Electric Co.; J. H. Sanford, Ohio Brass Co.; Otis G. Stewart, Electro-Metallurgical Co.; R. G. Turney, John A. Roebing's Sons Co.; T. R. Weichel, United State Bureau of Mines, and G. B. Southward, American Mining Congress.

PENNSYLVANIA

» » » On June 16 a meeting of operating and purchasing officials of 35 coal-producing companies was held in the Fort Stanwix Hotel, Johnstown, Pa., at which Dr. M. H. Stow, Deputy Director, Mining Division, WPB; J. L. G. Weysser, Deputy Chief, Coal Section, Mining Division, WPB, Washington, D. C.; and Richard Lloyd, Regional Technical Advisor, Mining Division, WPB, Pittsburgh, Pa., were present and gave a very clear explanation of and answered questions pertaining to the operation of the War Production Board's system of priorities for mining equipment and supplies.

A similar meeting was held the morning of June 17 at Punxsutawney, Pa., at which representatives of 12 companies from the western part of the district were present. Both of these meetings were sponsored by the Central Pennsylvania Coal Producers' Association for the purpose of assisting bituminous coal producers in the central Pennsylvania field to handle a rather complex problem. B. W. Deringer, production manager, the Central Pennsylvania Coal Producers' Association, acted as chairman at both meetings.

» » » The Dravo Construction Company of Pittsburgh, Pa., have commenced sinking two 850-ft. concrete-lined shafts to the Lower Kittanning, or "B" seam of coal, in the Wilmore Basin, about a mile south of the village of Wilmore, Cambria County, Pa., for the Berwind-White Coal Mining Company. From 7,000 to 8,000 acres of high-quality low-volatile coal will be developed from this operation. The main hoisting

shaft is down about 60 ft. and the grading for the railroad spur which comes off the main line of the Pennsylvania Railroad just east of Wilmore is nearing completion. This new development, the first of such magnitude in this district in a number of years, will eventually become one of Cambria County's largest producers.

» » » According to the Bureau of Mines, the commercial production of anthracite at midyear is 1,500,000 tons less than last year. Manpower, strikes, wage negotiations, continual rains, all these have made adverse contributions to the problem of increasing output. The cooperation of labor, industry, and Federal authority is needed to increase substantially the production of anthracite during the remainder of the year.

» » » At a meeting of the board of directors of the Pittston Coal Company an initial dividend of \$2.50 per share was declared for the first half of 1943 on the Class A preference stock payable July 1 to stockholders of record at the close of business June 19.

» » » Statistics from the Pennsylvania Department of Mines show these three collieries have produced over a million tons of coal during 1942: No. 7 colliery of the Susquehanna Collieries Company; Wanamie, Glen Alden; and Hazleton shaft of the Lehigh Valley Coal Company.

» » » Production per fatal accident in the anthracite area was less in 1942 than in 1941. In 1942 257,509 tons were produced per fatality, while in 1941 there were 285,408 tons produced per fatal accident. It is possible that the replacement of younger men by older men and the greater strain under which men now work influence unfavorably the accident rates.

» » » During May, J. McG. Stewart, of the Canadian Munitions Department, announced the freezing of anthracite shipments from the United States to Canada. A permit must now be obtained from the Coal Controller before delivering coal to Canada.

» » » A sizable stripping operation has been started by the Pottsville Contracting Company in the western tip of the Southern Anthracite Coal Field. Thomas Atherton, of Philadelphia, heads the project. The coal there produced will be cleaned in the Pottsville area.

» » » The solicitors of the City of Philadelphia intend to name some twenty anthracite coal mining companies in a suit aimed to restrain the dumping of silt into the Schuyl-

kill River. They are as follows: Bell Colliery Company, Buck Run Coal Company, Frackville Coal Company, Eagle Hill Coal Company, Haddock Mining Company, Jones Coal Corporation, Lehigh Navigation Coal Company, Inc., Mary D. Coal Mining Company, Morea-New Boston Breaker Corporation, Branch Coal Company, Otto Collieries Company, Pine Hill Coal Company, Pine Ridge Coal Mining Company, Big Valley Coal Mining Corp., Primrose Coal Company, Reppier Coal Company, St. Clair Coal Company, Winton Coal Mining Company, Peach Mountain Coal Company, and Colitz Coal Company.

» » » A four-man congressional committee made a survey of the Wyoming Basin for the purpose of getting first-hand information concerning surface subsidence due to mining. A press statement issued by the committee said that they would inform the Appropriation Committee regarding damages due to surface subsidences and recommended that "ample and sufficient funds be provided the Bureau of Mines for a complete survey with the idea of preventing mine caves in the future." The committee consisted of Michael Kerwin, Ohio; Al Carter, California; Ben Jensen, Iowa; and W. F. Norrell, Arkansas.

NEW YORK

» » » On June 1 the Women's Auxiliary of the American Institute of Mining and Metallurgical Engineers presented an ambulance fully equipped to the United States Army at the Engineers Building, 29 West 39th Street. Mrs. Thomas T. Read, president of the Women's Auxiliary, made the presentation and Captain John J. Morrissey accepted the ambulance on behalf of the United States Army.

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J. Noble Snider Addresses Annual Coal Forum

Purchasing agents told that probably 100,000,000 tons of coal may be needed in conversion from oil to coal

ON May 25 J. Noble Snider, vice president, Consolidation Coal Company, made an interesting address to the National Association of Purchasing Agents' Coal Forum, held at the Waldorf Astoria Hotel, New York City. He discussed the difficult problems of the coal-mining industry and pointed out some of the market possibilities of coal after the war. He said in part:



J. Noble Snider

"As far back as July, 1940, our industry, pledged to the President of these United States that we would keep the country supplied with coal if we were given the necessary manpower, mining materials and supplies and railroad cars.

In spite of loss of manpower through the draft for military service and through the attraction of cost-plus war industries, and increased absenteeism and difficulty and delay in securing needed materials and supplies, our industry actually produced 580,000,000 tons in 1942, or 20,000,000 tons more than was asked for by our Government.

"Why then the need for 'Government intervention' now? It is the failure of collective bargaining to accomplish a new working agreement with the men who work in and around the mines. While the controversy has been a distressing one, fraught with peril for the nation, it has focused the attention of the American people upon the coal industry and awakened in them a realization of what it is and how vital it is to them and to the whole war effort.

"It is to be hoped an awakened public, speaking through their elected representatives in Congress, will soon accomplish some fair and reasonable method of controlling and disciplining those who are at fault in interfering with or preventing the production of essential commodities.

"In an emergency you can help by going without shipments for a short time or accepting short shipments and balancing out your planned requirements by withdrawing coal from your storage pile. To some ears this may sound like heresy. It isn't meant that way. Stockpiling of coal is a very good thing. It is an insurance against trouble; or like money put in the savings bank for use on a rainy day. But

an emergency in the production of coal spells trouble, and that is when the stockpile justifies itself.

"One vital factor contributing largely to the tightness of the present situation is the new consumer of coal. One type is the new industry or the new plant making new and essential war material, which has been built in many sections of the country. A companion to it is the large military camps in all parts of the nation.

"Another is the plant or building heretofore using fuel oil for power and heat but now required to convert to coal. It was estimated several years ago that more than 100,000,000 tons of coal consumption in the eastern seaboard market had been converted to oil. Doubtless other plants were since constructed which used oil, so that while the volume of coal now needed by conversions from oil is not definitely known, it will probably amount to more than 100,000,000 tons.

"Other avenues leading to possible production increase have been and are being explored. One has been the development of stripping operations

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and all tamping guesswork and "take-a-chance-tamping" will be ended. They give the safest, surest shooting that more than meets all safety measures and give the shot-firer the easiest, quickest—all prepared—tamping ever used. Mines now using SEALTITE TAMPING BAGS have decreased tamping time and powder costs by increasing tonnage with more effective shooting.

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Rotary dump at the tipple of Hamilton Mine, Tennessee Coal, Iron & R.R. Co., Alabama

in mining districts which were heretofore limited to deep mining.

"Another avenue to increased production has been the adoption of the 6-day 42-hour work week. The operator pays time and one-half or rate and one-half for all hours worked over 35 in any one week, and to work the sixth day is optional with the miner. He can work or not as he sees fit and be free of any fine or discipline if he refrains from working. While the extra work time has added some production and overcome some losses it has not been as beneficial as it was hoped it would be.

"While Government authorities have recognized the increasing trend of production costs, the presently authorized maximum prices do not provide a sufficient margin of profit to permit the producer to absorb any further cost increases. There need be no fear of any 'unjust enrichment' of the producer thereby, for very little if any of the increase will be retained by him. It will be paid out to others in exchange for the labor and facilities necessary to produce the coal you want and need.

"It is the fashion of the day and the spirit of the time to look forward to the end of the war and the return of the peace; to plan for such peace; and to redesign the kind of place we hope the post-war world will be. The steps so far taken have been along national lines. Whether or not it is feasible to similarly look ahead and plan for an industry or a group of industries is doubtful. In any event, it seems particularly futile to attempt to do so now for the bituminous coal industry. Our future economy depends in large measure upon the scope and activity of a host of varied industries. The value of foreign markets in South America and elsewhere will be affected by the national pattern for foreign trade. What the status of competitive fuels will be will

also have an important bearing, as will also the future attitude of many consumers now forced to operate with bituminous coal.

"A program of research sponsored and supported by a large part of our industry is already making progress, and we believe that in the future coal will play a much more important part as a raw material in the manufacture

of many new items of consumer goods. In the field of chemistry our coal offers boundless opportunities for development, and it is well within reason to believe that there may be developed within the industry itself chemical plants designed and equipped to realize for the mine owners the great values their products contain.

"By further modernization and mechanization of the mining plant and equipment, and by the increased use of mechanical methods of cleaning and preparation of coal, it is anticipated a better product will be produced at little, if any, increase in cost.

"While it is hazardous to prophesy, it seems safe to predict that in the post-war economy bituminous coal will continue to be the vital raw material which the war emergency has clearly demonstrated it to be."

Anthracite for Cuba

A WELLMAN Galusha anthracite gas producer will soon be placed in operation at the plant of the Nicaro Nickel Company, in Cuba. It will require five cars of buckwheat anthracite daily, and the gas thus produced will be used in a process to recover nickel.

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**Type KSA Circuit Breakers
help produce
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Efficient substations mean more production by eliminating time losses resulting from disturbances on feeder circuits. This is true of the semi-automatic station which is attended only in starting and stopping and of the full-automatic station which requires nothing but rare, periodic attendance.

I-T-E has had more experience in the application of d-c circuit breakers in mining distribution systems than any other group, and our engineers will be glad to tell you how we can aid production.

I-T-E Representatives in Principal Mining Areas

CIRCUIT BREAKER CO.
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Central



States

ILLINOIS

» » » The Hillside Fluor Spar Mine at Rosiclare, Ill., has been taken over by the Inland Steel Company, through purchase of all the capital stock of the company. The property will be operated as a separate unit without any changes in the general policy, and shipments of fluorspar will continue to be made as heretofore to other companies as well as to Inland Steel.

ARKANSAS

» » » The Athletic Mining & Smelting Company has been authorized through a contract with the Defense Plant Corporation to build a Waelz kiln at its Fort Smith zinc smelter. About 150,000 tons of zinc residues which have been accumulated at the smelter for the last quarter of a century will be processed for the recovery of zinc. Capacity of the Waelz unit will be about 200 tons of residues per day.

MISSOURI

» » » The injunction suit brought by the City of Oronogo, Mo., to restrict mining operations in the Circle open pit mine was settled by mutual understanding and agreement on June 23, the day before the case was to be heard before Circuit Court Judge Ray E. Watson. The injunction was brought against the American Zinc, Lead & Smelting Co., owner of the property, and the Oronogo Mutual Mining Co., operator of the mine, on the contention that continued mine excavation would endanger the main street through the town of Oronogo.

OKLAHOMA

» » » Satisfactory progress has been made in dewatering many of the mines that were flooded in the Tri-State zinc mining area during May. Eagle-Picher Mining & Smelting Co. has resumed operations at all of its properties near Cardin, and the Bilharz Mining Co., northwest of Baxter Springs, have virtually completed their dewatering operations. Some of the smaller producers in the area, however, are still handicapped in their production due to flooded mine conditions.

MICHIGAN

» » » Two iron mines in Michigan reported their first production in May. Ore was encountered in the

development work at the Mather mine of the Negaunee Mining Company, at Ishpeming, Mich. This was hoisted and loaded into a railroad car for shipment on the morning of May 29. The development program for the Mather mine is very extensive and it will be many months before this property will be on a regular production basis.

The North Range Mining Company has opened a reserve in Iron County which formerly was held as two separate properties, known as the Oliver-Alpha and the Neely Exploration. These two properties, located about a mile north of the town of Alpha, have been combined and are now known as the Book mine. Much of the ore will have to be mined by underground methods, but in order to obtain production quickly and to facilitate later underground mining it was decided to strip a portion of the ore body and take out as much as possible by trucks. The overburden

was removed during the winter and spring and ledge was reached in May. A ridge of ore was encountered which had to be moved and this was mined on May 17, but was put in stockpile as railroad connections were not completed at the time. The Book mine is under the direct charge of Clyde W. Nicolson, assistant manager, North Range Mining Company.

The Sherwood mine of the Inland Steel Company, located in the Mineral Hills district in Iron County, produced and hoisted some ore last winter which went into stockpile, and regular shipments started this spring. The above three new mines will help maintain shipments of iron ore from Michigan as several properties face curtailed production this year compared with 1942. The Davidson No. 2 mine of the Pittsburgh Coke and Iron Company was closed down in May due to depletion of ore.

» » » A cave through to surface from a stope in a mine which had not worked for over 25 years created considerable interest in the old Amasa mining district in Iron County. The cause of the 30 by 30 ft. breakthrough is thought to be the unusual rainfall this spring, added to a heavy snowfall of last winter, which thoroughly saturated the ground.

SIMPLICITY GYRATING SCREENS

are operating 24 hours daily in many of the coal and metal mines using them today. To assist in keeping these units operating with a minimum of lost time, the Simplicity Engineering Company has arranged with the C.A.P. for *Courier Service*, so that urgently needed parts can be quickly flown to their destination. Another example of providing the fastest service available.



SIMPLICITY ENGINEERING COMPANY
DURAND, MICHIGAN

» » » The Cleveland Cliffs Iron Company have leased the Cambria-Jackson mine, located at Negaunee, on the Marquette Range, from the Republic Steel Corporation. Operation of the property was taken over on June 1 and will be under the general charge of W. W. Graff, district superintendent for the Cleveland Cliffs Iron Company, in the Negaunee district. The assistant superintendent of the property will be John Trosvig, who formerly was in the mining engineering department of the company. John Tregonning, of Negaunee, is underground mine captain.

» » » It is reported that the Copper Range Company has received approval from the WPB for a portion of their program for the development of the White Pine mine, in Ontonagon County. The White Pine mine was operated last in 1922, and from 1915 to 1922 produced 18,233,000 lb. of copper. The contemplated development will be located in new territory southeast of the old workings.

» » » The surface structures for the exploration of the Calumet & Hecla Consolidated Copper Company, near the village of Allouez, Keweenaw County, are in an advanced stage of construction. Shaft work will be pushed as soon as the headframe and engine house are erected. The change house is already in use. Underground operations will be directed by Capt. Howard McLeod, who returned to the Calumet & Hecla organization after he had spent several years in the iron districts as underground captain with the Inland Steel Company. This property will be completely electrified and will employ around 100 men underground and on surface when in full operation. The mine shaft will be called the Allouez No. 3.

» » » The U. S. Geological Survey and the Michigan Geological Survey are cooperating in a study of the geology of the ore occurrences in the Iron River district, Iron County, Mich. Charles F. Park, of the U. S. Geological Survey, is in active charge of the work and is being assisted by Carl Dutton, professor of geology at the University of Michigan. This work will include both surface and underground geological studies, with geophysical work later if it is found desirable.

» » » The Michigan Geological Survey and the Michigan College of Mines are cooperating in a geological study of the granite areas in northern Michigan. A search is to be made for strategic minerals, such as vanadium, tungsten, molybdenum, etc., which have been reported in small quantities from several locations in this part of Michigan. Professors A. K. Snelgrove, Wyllys Seaman, and Vincent Ayers will spend the summer in the field on this project.

» » » The Michigan State Tax Commission have set a taxable value on the iron mines of Michigan of \$60,206,000 for 1943. This compares with a valuation of \$63,439,000 for 1942. The copper mines were assessed at \$6,091,000 for 1943 and \$6,635,000 for 1942. These figures were announced May 19 after public hearings in several mining districts.

» » » The Bureau of Mines reports that in 1942 the production of copper (in terms of recoverable metal) was 45,500 short tons, a decrease of 2 percent against 1941. The principal

producers in the state were the Calumet and Hecla Consolidated Copper Company, Copper Range Company, Isle Royal Copper Company and the Quincy Mining Company. Among the measures taken by Federal agencies to stimulate copper production in Michigan, in addition to paying premium prices for copper produced at marginal properties, was the granting of a loan by the Metals Reserve Company to the Quincy Mining Company for the construction of a 4,000-ton mill for re-treating the company's tailing deposit at Mason, on Torch Lake.

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ARIZONA

» » » One of the richest zinc producers of northwestern Arizona, the Golconda mine, in the Cerbat district near Kingman, is again to come into production. E. E. Bollinger and Roy Williams, of Kingman, have obtained a 10-year lease from Pontiac Mines, Inc., on the mine and have applied for Federal funds for the necessary retimbering and dewatering.

» » » Arizona mines have received a total of \$841,000 in development loans from the Reconstruction Finance Corporation, it has been announced by J. S. Coupal, of the State Department of Mineral Resources. Yavapai County, in northern Arizona, led with \$299,000 in 32 loans. Cochise County had seven loans, totaling \$44,000; Pima County, 14 loans aggregating \$100,000; and Santa Cruz County, 2 loans totaling \$15,000. The three latter counties are in southern Arizona.

» » » Installation of an optical beam and polarizer for preliminary testing of quartz crystals urgently needed by the Federal Government for the manufacture of radio oscillators has been announced by the Arizona Bureau of Mines at the State University. Crystals satisfactory for use must weigh more than 3 oz., be water-clear, and at least 30 percent by volume free from cracks, bubbles, fractures, and flaws, it was said by Dr. T. G. Chapman, bureau director.

» » » Idle for 40 years, except for a short period during the World War, the old Antler copper-zinc mine in Cedar Valley, of Mohave County, is again to see activity under direction of the Vukoye Brothers.

» » » Its budget for the fiscal year reduced by \$600 a month, the Arizona State Department of Mineral Resources faces the probable reduction of two members of its staff, it is said by Charles F. Willis, chairman of the Arizona Mineral Resource Board.

» » » Active mining of non-metallic feldspar in the Wallapai district of Mohave County has led to the doubling of present output of the Consolidated Feldspar Corporation open-pit property. The installation of new screening and crushing equipment will double the plant's present output of 14 50-ton carlots monthly, which is in addition to smaller lots shipped daily by truck to points easily reached.

UTAH

» » » Various departments of the Utah Copper Company divided their votes in favor of both the AFL and CIO unions, according to unofficial returns following a two-day election at the Bingham, Utah, copper producer to determine a bargaining agent. On the basis of unofficial returns, two departments appeared to favor an AFL union while one appar-

ently favored "overwhelmingly" a CIO union, with three departments in doubt. Official returns are being withheld pending an official review of returns by National Labor Relations Board officials in Washington, D. C. Merle D. Vincent, Jr., twentieth district field examiner for NLRB, reported that of a total of 1,706 eligible voters, 1,084 workers cast ballots. The election was ordered by the NLRB after recent hearings which disestablished an Independent Union of Mine Workers at the properties on the ground the union was company dominated.

» » » Premium payments for metals received from the Federal Government were ruled out by the Utah State Tax Commission in a decision last week.

As a result \$6,500,000 was lopped off the 1943 metal mine valuation for tax purposes, bringing the total down to \$93,000,000.

» » » In a decision handed down June 15, the United States District Court of Utah sustained the contention of the Combined Metals Reduction Company that it was illegal for the Federal Government to collect old age security and unemployment compensation on its lessees. This case has been watched with interest by the entire mining industry as it will, unless other governmental agencies interfere, restore mine lessees to the basis of independent contractors and bring about a return of mine lease activity throughout Utah and other states. The action was brought by the Combined Metals Reduction Company against the Federal Government to recover \$18,655.79 paid under protest under the Social Security Act.

» » » The pinch of a tightening labor situation is being keenly felt throughout the metal mining industry of Utah. A recent survey of the situation revealed that conditions have been growing steadily worse in recent months and that approximately 1,300 men were needed to maintain production of copper, lead and zinc at the 1942 production level. Metal mine operators throughout the Utah area are making a desperate bid to maintain workers and to attract new workers to the industry. This was the substance of general conclusions following a discussion between metal mine operators of Utah and former President Herbert Hoover in Salt Lake City on June 15. Various operators poured their troubles into the willing ears of Mr. Hoover, and the latter indicated his willingness to swing his influence behind any movement which would insure future production of metals and adequate development work to prevent depletion of the mines.



Open pit mining operations at the Three Kids manganese mine, Las Vegas, Nev., owned by Manganese Ore Co., subsidiary of the M. A. Hanna Company



Moving parts of all drag classifiers are well safeguarded in the Arthur and Magna mills of the Utah Copper Co.

Utah has been designated as one of the most critical labor areas in the United States as a result of the influx of war industries and army and navy plants into the State.

Some relief was promised and some is in evidence as a result of recent action by the Utah Industrial Commission. The commission opened the door of smelters to women in line with legislation passed at the last session of the Utah Legislature. High school students under 18 years of age have also been granted permission to work during the summer in mines.

So serious has become the situation that the City of Tooele has undertaken the recruitment of business men and farmers to work part time at the Tooele plant of the International Smelting & Refining Company.

Operators are hoping that the army can see fit to again furlough soldiers to the vital mining industry so that there will be sufficient metals to supply the soldiers at the fronts.

» » » The feasibility of reopening the old Horn Silver property in the San Francisco district, Beaver County, Utah, on a large scale is being considered by A. E. Kipps, geologist. Mr. Kipps has a small crew at work reopening old workings to determine the amount of low-grade ore left during former operations. Mr. Kipps is familiar with the Horn Silver, having operated there several years ago.

» » » The Reconstruction Finance Corporation has granted a loan of \$775,000 for the construction of an alumina production works to Aluminum, Inc., of Marysville, Utah, according to word from Washington, D. C. According to the announcement, \$450,000 will be set aside for plant construction and the balance for operation at the company's property in the Marysville alunite field. This is the second plant to be financed by the

Government for the treatment of Utah alunite. Kalunite, Inc., plant at Salt Lake City is now nearing completion. Aluminum, Inc., was originally incorporated by Cleveland interests together with Ralph Moffat, formerly of Cleveland.

» » » Stockholders of the New Park Mining Company were told at the annual meeting in Salt Lake City recently by W. H. H. Cranmer, president, that developments on the 1,000 level have exceeded expectations and the mine is assured of a substantial life.

A training program for men has


been inaugurated at the mine and this together with intensive mechanization is expected to increase production to 300 tons per day, he said, thus enabling the company to keep its promise to double production. Reasons for undertaking development at the Showers and Bowers property in the Tintic district were outlined at the meeting. Evidence that zinc ores running 37 percent prompted reopening of the mine under a \$5,000 RFC loan. A supplemental loan is now being sought and unwatering operations are expected to be completed soon so that Government engineers can make their recommendations.

» » » The Ohio Copper Company of Utah has started construction on a 250-ton mill at the Big Indian property located in the LaSal district of San Juan County. Last operated in 1920, the ores were treated by flotation. Leaching, however, will be undertaken by Ohio Copper. Mining by Ohio Copper will be conducted by open-pit methods. Past records show mill heads of 3.5 percent copper. Ohio Copper is continuing operations at its Bingham property where leaching in place and retreatment of tailings is under way.

MONTANA

» » » Miners' Day, June 13, was celebrated in Butte, Mont., in traditional manner by a parade, and speeches by members of the International Union of Mine, Mill and Smelter Workers. This year marked


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Drilling in a stope of the Anaconda Copper Mining Co., Butte, Mont.

the sixty-fifth anniversary of the occasion and, falling on Sunday, miners celebrated briefly and returned to work Sunday night and Monday. In a national radio broadcast on the program "Soldiers of Production," Butte miners and craftsmen had the opportunity to tell the nation how copper is mined and hoisted in Butte. Stanley Babcock, president of the Miners' Union, concluded the story of mining operations by telling the radio audience "not to worry about copper. We'll get it out."

The afternoon program took place at Columbia Gardens, where the need for copper production was stressed. Among the speakers were Maj. G. J. Tierney, U. S. Army, Ninth Service Command Headquarters, Salt Lake City; Reid Robinson, head of the International Union of Mine, Mill and Smelter Workers; James Carey, secretary-treasurer of the Congress of Industrial Organizations; Mrs. Faye Stevenson, Washington, D. C., president of Congress of Women's Auxiliaries; Mayor Barry O'Leary, of Butte; Stanley Babcock, president, Miners' Union, was chairman. James Carey stressed the importance of labor's responsibility to produce all it can and he cited figures on food consumption by the United States and British forces which average 4,500 calories a day, against 3,000 for the Chinese soldier and only 1,500 calories for the Russians. Reid Robinson strongly criticized John L. Lewis, head of the United Mine Workers, as aiding and abetting the Fascist interests by calling strikes in the coal industry.

A Miners' Union banquet closed the celebration Sunday night, with Butte officials of the Anaconda Copper Mining Company and other guests attending.

» » » The new college year at Montana School of Mines started July 6 with about 90 percent of the

facilities of Butte's famous technological college devoted to a new Navy college training program, known as V-12, according to President Francis A. Thomson. Since many of the mining schools and other colleges of the country which include mining departments have been designated for Army training, it is the Navy's intention to transfer to the small number of mining schools which are Navy schools the V-1 and V-7 Naval Reserve mining students now enrolled in non-Navy colleges. These advanced standing naval students, from Montana School of Mines as well as from other mining schools who may be transferred to Montana in V-12 (S), are to complete their specialized engineering training for their degrees in mining, metallurgy, and geology. Certain naval engineering courses will be added to these curricula. Naval students with advanced standing will, however, pursue their professional studies in an accelerated course of 16-week terms and will, therefore, have to cover the work of the usual college year in 32 weeks.

IDAHO

» » » Federal Mining & Smelting Company has unwatered the old 'Frisco shaft to the 600 level below the tunnel entry and is stoping in a new vein of zinc-lead ore north of and paralleling the old 'Frisco vein. The mine is now producing 100 tons of zinc-lead ore per day, which is hauled by truck to the company's Morning mill at Mullan.

» » » The Lucky Friday Silver-Lead Mines Company, operating a prospect development property at Mullan, has shipped lead-zinc, copper ore and received smelter returns totaling \$77,715.78. The property is

located in the Coeur d'Alene district in which no other producing mines have been found. The company has completed sinking its main shaft to a depth of 600 ft., and has cut the vein of that level with a crosscut, showing ore 7 ft. wide averaging 17 oz. silver. Assays from a 12-inch streak show 49 oz. silver, 5.8 percent lead and 8 percent zinc.

» » » Sunshine Mining Company's preliminary report for the first quarter of 1943 shows an estimated mine income of \$162,021.96, as compared with \$286,159.91 for the corresponding period of 1942. Manager R. D. Leisk reports the favorable development of the Yankee Girl vein. This development is on the 3,100 level of the Sunshine workings, where two crosscuts, about 1,500 ft. apart, have intersected the Yankee Girl vein. The company has drifted on this vein from both crosscuts, and now lacks only a few hundred feet of completing a connection of the drift work. The development so far averages 19.6 oz. of silver from grab sampling of the muck pile during drifting operations. This vein is all virgin territory, having no production except the ore removed in the present exploratory work.

The company's new electrolytic antimony reduction plant is now in full operation and in addition to treating Sunshine ores for antimony removal before smelter treatment, the company has contracted to treat the concentrates from the Coeur d'Alene Mines property, which latter company is producing 600 tons a day of tetrahydrite (silver-lead-copper-antimony) ore similar to Sunshine.

» » » The Tamarack & Custer, Sherman Lead and Dayrock mines managed by the Day interests re-



A general view of the surface plants and buildings of the Sunshine Mining Co., near Kellogg, Idaho

cently declared their first dividend for 1943. The Tamarack & Custer dividend amounts to three cents a share, or \$150,000, and brings the total dividend record for the company to \$2,142,123. The Sherman Lead Company dividend totals \$73,500 at the rate of two cents a share and brings the company's total dividend record to \$448,350. The Dayrock dividend is for two cents a share and totals \$34,943.68, bringing the company's total dividends to date to \$341,497. Directors of the three companies announced that future dividends will be made whenever financial condition of the companies warrant such profit disbursements, depending on increasing mining costs, higher federal taxes and manpower supply.

» » » One of the largest mining development enterprises undertaken in the Coeur d'Alene District in recent years is now under way in the Beaver District north of Wallace, where the Monitor Mining Company, under management of the Day interests, has consolidated a number of small inactive mining companies into one group of 97 mining claims. Principal operations are at the old Amazon-Manhattan property, idle for 20 years, where the Monitor Company has expended over \$100,000 in preliminary work in repairing old workings, constructing new buildings, grading roads and installing machinery. Principal ores of the district are zinc, accompanied by a smaller amount of lead. Government engineers have been diamond drilling in the district all winter and have discovered two and possibly three new zinc veins in addition to the known veins already opened.

» » » The Bunker Hill & Sullivan M. & C. Company has completed the work of remodeling and enlarging its milling plant at Kellogg, increasing the capacity from 1,500 tons to 1,800 tons per day. The reconstructed plant consists of a sink-and-float unit designed to handle the entire mine tonnage and discard a certain percentage of the waste material, after which the improved mill feed will go through a 5-unit system, each consisting of a 5-foot ball mill, followed by lead and zinc flotation machines. Each unit is designed to handle 360 tons per day.

» » » Federal Mining & Smelting Company's net earnings for 1942 totaled \$1,301,616.53, according to the company's annual report. The company operates both in the Tri-state field and the Coeur d'Alene District. In the Tri-state field the company suffered a major loss this spring in the destruction by fire of its big Muncie milling plant. The company's largest producing property is the Morning mine at Mullan, Idaho.

Earnings of the Morning mine in 1942 were \$664,124.22, a decrease of \$138,093.51 from the earnings of 1941, caused by labor shortage. The average grade of ore mined during the year was 7.1 percent lead, 2.7 ounces of silver and 7.9 percent zinc.

» » » Coeur d'Alene Mines Corporation annual report shows earnings of \$111,370.48, after deducting \$126,424.02 for depreciation, \$119,476.19 for depletion and \$151,438.97 for taxes. Dr. Herbert Mowery, president of the company, states that operations for the year show a decrease of \$2.89 in net profits per ton of ore mined as compared to 1941, due to a small decrease in the silver content of the ore and increased cost of production.

WASHINGTON

» » » At the annual meeting of the Metaline Mining and Leasing Company, held June 15 in Spokane, D. I. Hayes, general manager, reported that diamond drilling in a horizon 100 ft. below the lowest level of the mine had revealed prospects for a substantial volume of zinc ore of good grade. The company recently completed installation of two Fairbanks-Morse diesel-driven power units in the Grandview Mill to supply power for the company's Metaline and Grandview operations. The diesel installation will serve as a standby unit when necessary. At present these units are supplying power for operation until surplus current again becomes available from Pend Orielle Mine power plant.

» » » Labor unions have gone on record "deploring" the closing down of the meat-packing plants in Yakima and Kittitas Counties, Wash. The inequalities of OPA prices for meat caused the shutdown.

» » » The first of the units of the new Government-owned magnesium plant at Spokane, Wash., went into operation late in May. The plant is being built and operated by the Electro-Metallurgical Company, a subsidiary of the Union Corporation, or the Government Defense Plant Corporation. The new plant is the first and largest completely integrated mill for the production of magnesium from dolomite by a thermal reduction method. Capacity of the plant, when it is in full operation by the end of this year, will be approximately four times the entire annual pre-war production of the entire United States. The methods for the production, and the furnaces and equipment were designed by the Electro-Metallurgical Company. In this process, calcined dolomite is smelted with ferro-silicon in large electric furnaces. Electric

power is obtained from the Grand Coulee Dam hydro-electric development.

» » » An exploration program is under way in an area near the property of the Northwest Magnesite Company, 12 miles west of Valley, in Steven County. Butler Bros., of St. Paul, are reported to have an option for leases on a number of claims, and a contract with the Sullivan Machinery Company has been in effect for more than two months, during which time drilling has been under way. The project is presently called the Double Eagle.

CALIFORNIA

» » » Completion of the aerial tramway of the Grey Eagle Copper Company is expected in the near future. A flume to convey tailings into settling tanks was recently placed in service to comply with efficient game laws of California so as to prevent pollution of the nearby Indiana Creek.

COLORADO

» » » The Idarado Mining Company has been granted a loan by the Metals Reserve Company to reopen the Black Bear Mine in the Telluride Mining District, Colorado. Part of the project will include the driving of a tunnel approximately a mile and one-quarter long. It is estimated two years will be necessary to complete the tunnel. This work is expected to increase zinc production over 5,000 tons of metal annually when the mine is operating at capacity. The over-all cost of the project is estimated to be \$1,300,000.

NEVADA

» » » Tungsten deposits near Rose Creek, in Pershing County, Nev., were studied in the field seasons of 1939, 1940, and 1941, by geologists of the Geological Survey, United States Department of the Interior, who were mapping the geology of the Sonoma quadrangle. The deposits were revisited in the fall of 1942 by Ralph J. Roberts, of the Survey, who prepared geological maps of the Rose Creek mine and adjacent ground.

» » » Operations at the mines of the Tonopah Belmont Development Company, one of the largest silver-gold producers in the Tonopah District have stopped, as the company is being liquidated. During its 23 years of production the company paid approximately \$11,000,000 in dividends.

Wheels

(Continued from page 56)

nation treatment may be withheld from countries participating in international cartels to the disadvantage of American trade.

Determined efforts (all defeated) were made by Senators Danaher (Rep., Conn.), O'Mahoney (Dem., Wyo.), Maloney (Dem., Conn.), McCarran (Dem., Nev.), and Reed (Rep., Kans.), to provide for congressional ratification and other guarding limitations on the negotiators, but the Administration marshalled its forces on the plea that any such limitations would affect our relations with foreign countries at a most critical time.

Silver Battle

The long-drawn-out contest between producers of newly-mined domestic silver and the jewelry, flatware, and other non-essential fabricators over the Green Bill in the Senate and the House-passed Celler amendment to the Treasury-Post Office Bill was composed late in June by the passage of the Green Bill with amendments removing provisions under which silver sold for civilian needs would be limited to those uses "contributing to the war effort."

The Green Bill as passed by the Senate with amendments now reads:

"That the President is authorized, through the Secretary of the Treasury, upon the recommendation of the Chairman of the War Production Board, to sell or lease for domestic purposes for a period of not longer than six months after the cessation of hostilities in the present war, as proclaimed by the President, upon such terms as the Secretary of the Treasury shall deem advisable, to any person, partnership, association, or corporation, or any department of the Government, for purposes, including but not limited to the making of munitions of war and the supplying of civilian needs, and the converting of existing plants to those purposes, any silver held or owned by the United States: Provided, That no silver shall be sold under this act at less than 71.11 cents per fine troy ounce; Provided further, That at all times the ownership and the possession or control within the United States of an amount of silver of a monetary value equal to the face amount of all outstanding silver certificates heretofore or hereafter issued by the Secretary of the Treasury shall be maintained by the Treasury.

"Sec. 2. This act shall expire on December 31, 1944."

Promptly thereafter, the House accepted the report of its conferees eliminating the Celler amendment, which would have denied use of any funds to administer the silver purchase acts.

The Green Bill is now before a

House Ways and Means Subcommittee composed of the following: John D. Dingell of Michigan (Chairman), James P. McGranery of Pennsylvania, Noble J. Gregory of Kentucky, Paul H. Maloney of Louisiana (Democrats), Daniel A. Reed of New York, Richard M. Simpson of Pennsylvania, and Charles S. Dewey of Illinois (Republicans).

BOOK REVIEWS

WORLD MINERALS AND WORLD PEACE, by C. K. Leith, J. W. Furness and Cleona Lewis. *The Brookings Institution, Washington, D. C.* Price \$2.50. 253 pages.

Mining engineers, geologists and mineral economists will find this 9½ by 6 in. book a very concise compilation of facts about the world's past and present mineral supply, and how future peace depends upon access to raw materials. It points out that "the mineral problem began to take form during World War I, and since then it has taken on new phases and has become ever more acute. It is now recognized as one of transcendent importance for the future peace of the world. . . . The purpose of this book is to present a factual study of trends in the mineral field—physical, economic and political—and, in the light of these trends to analyze the possibilities of controlling minerals to prevent preparation for war."

This book presents the facts and the reader draws his own conclusions regarding the possibilities for solution of the international problem of mineral accessibility.

The book has three parts. Part I contains six chapters which discuss, in order of their presentation, The Growth of World Mineral Production, "New" Minerals for Industry, The Present Mineral Position of the Nation, Mineral Position of Present Belligerent Groups, The Interdependence of Nations in Regard to Minerals, and The Permanency of the Mineral Situation.

Recent Trends in Political and Economic Control is the title of Part II.

Part III discusses the future. The final chapter entitled, "Mineral Control in Relation to Peace," is prepared by C. K. Leith, who points out that the Atlantic Charter foreshadows the adoption of a mineral control policy, but does not provide a plan for putting it into effect, and he proceeds to review some of the plans that have heretofore been suggested.

The three authors have produced a volume which is an important guide book for all persons to study and conclude what should be done in preventing future wars.

COKE FORMATION PROCESS AND PHYSICO-CHEMICAL PROPERTIES OF COAL, by W. Swietoslowski. *Herald Square Press, 233 Spring St., New York, N. Y.* Price \$3.50.

This book deals with fundamentals of the coke-making process. In the main it is a review of recognized physical and chemical properties of coals and cokes, but the review is critical. Present methods of studying coking properties of coal are analyzed carefully and in many instances worth-while improvements are suggested that might be adopted in existing techniques. The book contains a resume of much experimental work done at the Institute of Technology of Warsaw, Poland.

Although primarily a book for the researcher in the coke-making field, it will be of interest to most operators of coke ovens in this country. The book is readable and interesting. In particular, the treatment of the phenomena occurring during the plastic range are of more than usual interest to anyone concerned with the coking of coal.—BYRON M. BIRD.

GREEN FIRE, by Peter W. Rainier. *New York City: Random House.* 1942. Price \$2.75. 300 pages.

If you like autobiography that is full of romance and adventure, of vivid descriptions of awesome scenery, of information about emeralds and emerald mining, of expert characterization of a very diverse array of humanity, and withal very beautifully written, this is the book for you. You'll find it more entertaining, and of course more instructive, than most novels.

Mr. Rainier is an engineer, but, wonder of wonders, he is an engineer with an extraordinary gift for writing. He says he learned to write by correspondence—or, at least, that he took courses; but the literary gift is not bestowed by correspondence. *Green Fire* is the story of the years Mr. Rainier spent in adventuring and mining emeralds in Andean Columbia. He tells us much about emeralds and the mining of emeralds, which is natural, seeing that he probably knows more about both than any other man living, but mining with a crew of brutal, murderous, devilish Indians was just his job; his real enthusiasm was for the wild and varied stupendous country into which his labors and his vacations brought him.

Every lover of nature, every lover of the trail, whether of mountain or jungle or roaring river, will love this book, and the unadventurous who merely love good literature will admire its craftsmanship.—CARL NAEHTER, University of Southern California.

Manufacturers Forum

New Plastic Battery Retainer

Announcement of a plastic storage battery retainer manufactured from polystyrene, for use in certain types of Exide batteries, is made by the Electric Storage Battery Company, Philadelphia.

The new retainer not only has technical advantages but is also said to be more permanent than the former type of retainer, according to the company. In addition, as it is now being manufactured, it uses less critical material.

Surface Facing Tool

An adjustable tool for efficient surface facing in horizontal or vertical milling machines, lathes, and other spindle machines is announced by Robert H. Clark Company, 3424 Sunset Boulevard, Los Angeles, Calif. As shown here, it consists of a tapered (or straight) shank and body with three adjustable high-speed bits,



which may be set for any diameter within the range of the tool. With only four tools any diameter from 1 1/4 to 5 in., inclusive, may be obtained without being limited to standard fractional dimensions.

A measuring gauge is provided with each tool for quick and accurate size adjustments. The bits can be easily reground or can be replaced with new bits at comparatively small cost, thus lengthening the life of the tool indefinitely.

The tool is useful for dressing castings of any metal, dovetailing, spot facing, as an emergency repair tool, and many other end mill, facing mill, or slab mill operations.

Gearmotors

A new line of horizontal parallel shaft type Gearmotors which meet speed reduction requirements for a wide variety of industrial applications over a range of 1 to 75 hp. is announced by Westinghouse Electric and Manufacturing Company, East Pittsburgh, Pa. Each new unit conforms to A. G. M. A. standard output speeds and application practices.

The use of adaptor castings between motor and mechanical parts allows the use of all standard Westinghouse N. E. M. A. frame motors with each type of unit, and types of motor construction can therefore be readily changed to suit varying service conditions if necessary in the field. The design of the motor-adaptor assembly being common between unit types, such assembly can be readily shifted between unit types to meet changes in speed requirements. Many working parts including gear sets being common to all three unit types of a given rating, replacement part programs are held to a minimum.

Gears and pinions in the new Gearmotors are of .40-.50 carbon steel, and are given special heat treatment before hobbing. The new units are said to feature compactness and improved foundation stability through heavy exterior ribbing of the housing at each mounting hole.

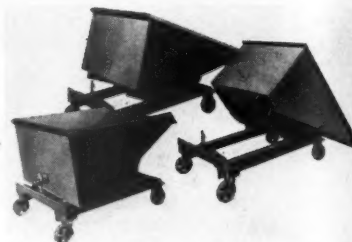
Gear and Wheel Puller

Armstrong-Bray & Co., 5364-78 Northwest Highway, Chicago, Ill., announce an addition to their line of Steelgrip rigid-arm gear and wheel pullers. The new pullers add to a line that covers a wide range of jobs, for factory work, tank, tractor, truck and farm machinery maintenance, etc.

The new Steelgrip rigid-arm gear and wheel pullers are of the same rugged construction as the rest of the line; the forged steel arms, forcing screw, etc., are heat-treated for great strength. They are made in three sizes. They pull spoked wheels, solid gears, pinions and sheaves whether close up or at considerable distance from the end of the shaft. They can be used in the most awkward places—wherever chains can be run. They are equipped with chain hooks on one end and special hook for small motor pulleys and bushings on the other.

End Dump Hopper

A new model automatic end dump hopper on casters is announced by H. L. Pitcher Company, exclusive sales agent for the products made by the Rose Manufacturing Company, Detroit. When the latch is released and the load is dumped the bucket is so balanced that it automatically returns and latches in position when reloaded. It rides empty in the balanced position. Mounted on heavy-



duty all-steel casters, it is a particularly adaptable unit for the handling of sand, gravel, coal, stampings, small castings and all kinds of scrap and refuse. It is built of structural steel and heavy plate—and is designed to fit any kind of lift truck but may be built to specifications as to capacity and yardage content.

Carbon Dioxide Fire Extinguisher

The General Detroit Corporation, 2200-2272 East Jefferson Avenue, Detroit, Mich., announces the manufacture of carbon dioxide fire extinguishers.

Its new unit, known as the C-D/FOG, is said to literally "freeze" fire. The carbon dioxide discharge of the extinguisher is reported to kill fire in a few seconds by penetrating to every corner where fire exists, excluding and replacing the oxygen necessary to combustion. It may be discharged safely on live electrical equipment. Fires in oils, greases, flammable liquids are said to be quickly controlled, and the discharge leaves no trace on the finest mechanism or material.



Company Changes Name

The name Steacy-Schmidt Manufacturing Company has been changed to Hardinge Manufacturing Company. This involves no change in management or company policies.

Hardinge Manufacturing Company (formerly Steacy-Schmidt Manufacturing Company) is a Pennsylvania

corporation and is a subsidiary of Hardinge Company, Inc., a New York corporation.

The principal reason for the change is to identify the two companies more closely with each other than was possible heretofore.

As in the past, Hardinge Company, Inc., the parent corporation, sells specialized equipment to mining, chemical, and other process industries, while Hardinge Manufacturing Company, in addition to manufacturing for the account of Hardinge Company, Inc., also manufactures in its pattern, foundry, plate, machine, and assembly shops to the specifications and designs of other corporations and Government agencies.

Headlight Volt Reducer

The Mosebach Electric and Supply Company, 1152 Arlington Avenue, Pittsburgh, Pa., announces a new headlight volt reducer and holder socket, and a new mercury reversible headlight switch. They are designed for the operation of headlights on mine locomotives and are constructed to carry 275 volts, D. C.

The rotary type mercury reversible

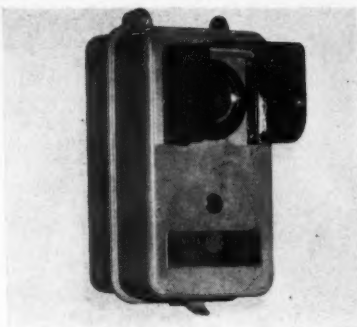


headlight switch is equipped with a fuse that has a sufficient capacity for either or both headlights. When the switch handle is in the forward position the switch operates the front headlight and when reversed the switch lights the headlight on the rear of the locomotive. The switch is enclosed in a Mesco bronze case with a double seal to protect it against dirt and moisture. The switch should be mounted vertically to keep the mercury at the bottom of the tubes.

Outdoor Photoelectric Relay

A new general-purpose photoelectric relay for outdoor use has been announced by the Electronic Control Section of the General Electric Company, Schenectady, N. Y. Designated as the Type CR7505-K108, it is for applications requiring rapid and accurate counting, controlling, sorting, or limiting operations. Its contacts control 2 amperes at 115 volts, 25- to 60-cycles, alternating current, or 0.5 ampere at 115 volts, direct current.

In addition to a Type GL-930 phototube, the new relay contains a Type



GE-117P7GT phototube. This amplifier tube is outstanding in two respects—its filament operates on full line voltage, eliminating the need for a filament transformer; and it incorporates a diode rectifier which functions when a-c power supply is used. The relay can be mounted in any position and can be adjusted under actual operating conditions, without removing the cover.

Bulletin GEA-1755E gives details on this and other photoelectric relays.

CATALOGS AND BULLETINS

ARC WELDERS. *General Electric Co., Schenectady, N. Y.* Bulletin GEA-1440J describes and illustrates the operation of the manufacturer's Type WD direct-current, single-operator arc welders. 12 pp.

BATTERY-CHARGING EQUIPMENT. *General Electric Co., Schenectady, N. Y.* Bulletin GEA-3923 describes the company's automatic battery-charging equipment for motive-power batteries. 8 pp.

EQUIPMENT FOR MINES. *Chicago Pneumatic Tool Co., 6 East 44th St., New York, N. Y.* Catalog No. 600, second edition, describes and illustrates and gives specifications of the manufacturer's line of pneumatic tools, compressors, compressor accessories, diesel engines, rock drills, and electric tools. 68 pp.

HOW TO MAKE YOUR COAL WORTH MORE. *Roberts and Schaefer Co., 307 N. Michigan Ave., Chicago, Ill.* Bulletin No. 160. This is the title of an attractive bulletin issued by the company, illustrating and describing 7 case histories how coal producers found ways to make their coal worth more. Drawings and specifications of the manufacturer's hydrotator process and tandem hydro-separator units are also described. 16 pp.

IGNITRON RECTIFIERS. *General Electric Co., Schenectady, N. Y.* GEA-4047 is a bulletin which features the manufacturer's portable sealed-ignitron mercury-arc rectifiers for mining service. 4 pp.

MAGNETIC SEPARATORS. *The Dings Magnetic Separator Co., 509 E. Smith St., Milwaukee, Wis.* Catalog No. 550 describes and illustrates features of the company's Dings-Crockett magnetic separators for concentrating magnetite

and for cleaning ferrous media in sink and float plants.

MOTOR CONTROLS. *General Electric Co., Schenectady, N. Y.* Bulletin GEA-4015 is a simplified guide to the selection and application of commonly used motor controls. 16 pp.

PREVENTING COAL DUST. *The Johnson-March Corp., 52 Vanderbilt Ave., New York, N. Y.* Bulletin 100-C describes and illustrates applications of the manufacturer's product known as Coaladd to make coal dustless. 16 pp.

PUMPS. *Ingersoll-Rand Co., 11 Broadway, New York, N. Y.* Form 7073 is a booklet describing the manufacturer's vertical axial and mixed-flow pumps for pumping large volumes of liquid at comparatively low heads. 20 pp.

SHAKER CONVEYORS. *Goodman Manufacturing Co., Halsted St. and 48th Pl., Chicago, Ill.* Bulletin CC-424. The company has issued an attractive and well-illustrated brochure describing features of their line of shaker conveyors for use in coal and metal mines. The manufacturer's line of duckbills are also described and illustrated, together with the various types of shaking conveyor drives, troughs, belt conveyors, chain conveyors, and shortwall coal cutters. Schematic layouts for typical shaker conveyor mining methods for coal and metal mines are also shown. 60 pp.

STEEL CASTINGS. *The Eimco Corporation, 634-666 South Fourth West St., Salt Lake City, Utah.* Bulletin 801 describes the manufacturer's line of electric furnace steel castings for mining and other industrial uses. A description of the company's repair and replacement services is also included.

SWITCHBOARD INSTRUMENTS. *Roller-Smith Co., Bethlehem, Pa.* Catalog 4220 describes and illustrates features of the manufacturers line of switchboard instruments. 12 pp.

SYNTHETIC RUBBER. *U. S. Rubber Co., 1230 Sixth Ave., New York, N. Y.* This attractive booklet describes and illustrates the story of making synthetic rubber as experienced by the manufacturer. Comparative properties of the various types of artificial rubber now available to industry are listed. A glossary of terms commonly used in the production of artificial rubber is also included. 44 pp.

TRACK CUTTER. *Sullivan Machinery Co., Michigan City, Ind.* Bulletin C-10 describes and illustrates features of the manufacturer's T-AU track cutter for cutting seams of coal.

TRACTORS. *Caterpillar Tractor Co., Peoria, Ill.* Form No. 7995 entitled "Caterpillar Producing for Victory" illustrates the numerous applications of the manufacturer's product in the field of mining and other industries vital to the war program.

VIBRATING EQUIPMENT. *The Jeffrey Manufacturing Co., Columbus, Ohio.* Catalog 750 is a comprehensive book describing the manufacturer's line of feeders, Waytrol (constant weight feeders), bin valves, conveyors, dryers, coolers, packers, screens, electrical equipment and the manufacturer's line of miscellaneous equipment for mining and other industrial uses. The catalog is profusely illustrated and there are numerous drawings giving specifications of numerous types of equipment.

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